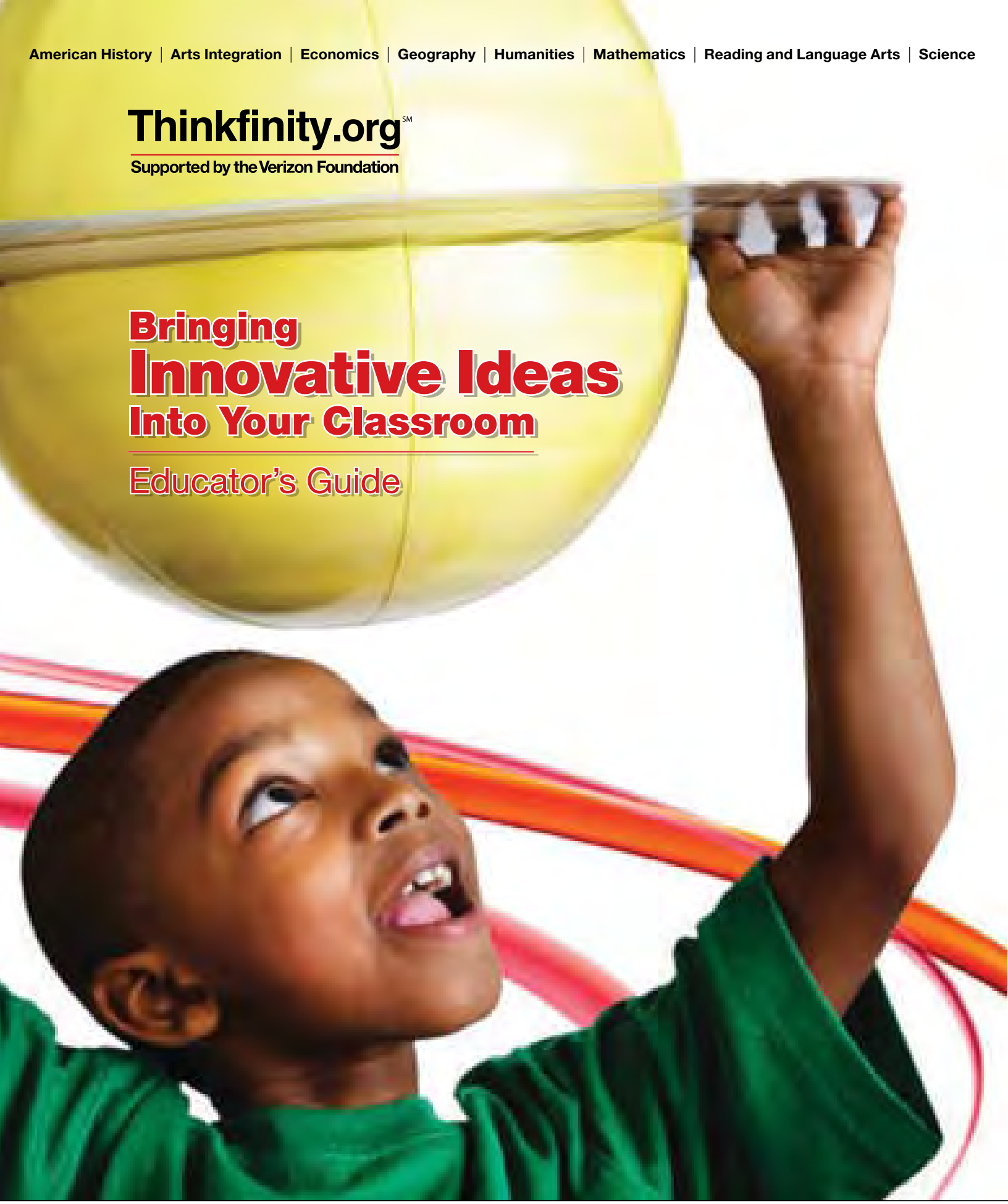
American History | Arts Integration | Economics | Geography | Humanities | Mathematics | Reading and Language Arts | Science

Thinkfinity.org℠

Supported by the Verizon Foundation

Bringing Innovative Ideas Into Your Classroom

Educator's Guide



The Kennedy Center ARTSEDGE | EconEdLink National Council on Economic Education | EDSITEment National Endowment for the Humanities | NCTM ILLUMINATIONS | read·write·think International Reading Association NCTE | Science NetLinks AAAS | Smithsonian National Museum of American History Kenneth E. Behring Center | National Geographic XPEDITIONS | ProLiteracy Worldwide | National Center for Family Literacy

Thinkfinity

Message from the Foundation President:

It is with great pleasure that we announce the creation of ***Thinkfinity***, the Verizon Foundation's signature digital learning platform designed to improve educational and literacy achievement.

Thinkfinity is built upon the foundation's flagship education program, Verizon MarcoPolo, and the foundation's comprehensive online resource for literacy, the Verizon Literacy Network.

Thinkfinity reflects the Verizon Foundation's goal of truly making a difference in the lives of students, teachers, families and the communities in which they live and work. We are doing this by supporting quality educational resources and programs that enable lifelong learning and growth. We are fortunate that our Content and Literacy Partners in this endeavor are the premier organizations in seven K-12 academic subjects and in literacy instruction, along with outstanding organizations and institutions across the country that serve as Rollout Partners to take ***Thinkfinity*** into schools, literacy programs and communities nationwide. Through our collaboration and work, we deliver the highest quality, standards-based and research-based educational and literacy resources to teachers, instructors and students.

Thinkfinity will continue to grow in the coming months and years. This growth will be directed through the shared vision of the Verizon Foundation and its partners to extend the reach and impact of ***Thinkfinity*** beyond traditional classroom and instructional settings. In order to support lifelong learning, we will provide resources for after-school, parent and community organization audiences, make content available on new technology platforms and enhance professional development.

Thinkfinity means "endless possibilities for learning." Our goal and our mission are to support the present and future needs of our global society, and, through ***Thinkfinity***, deliver resources to advance the knowledge and skills that are required of citizens in the 21st century.

Sincerely,

Patrick R. Gaston
President
Verizon Foundation

The Thinkfinity Partnership

American Association for the Advancement of Science

International Reading Association

National Center for Family Literacy New!

National Council of Teachers of English

National Council of Teachers of Mathematics

National Council on Economic Education

National Endowment for the Humanities

National Geographic Society

ProLiteracy Worldwide New!

Smithsonian's National Museum of American History New!

The John F. Kennedy Center for the Performing Arts

Verizon Foundation

Thinkfinity Content Aligned to National Standards

National Standards for Arts Education

National Content Standards in Economics

National Council for the Social Studies Standards

American Council on the Teaching of Foreign Languages Standards

National Standards for Civics and Government

Principles and Standards for School Mathematics

International Reading Association and National Council of Teachers of English Standards for the English Language Arts

Benchmarks for Science Literacy

National Center for History in the Schools Standards

National Geography Standards

Verizon Foundation is a proud member of the International Society for Technology in Education (ISTE) 100 alliance. ISTE 100 is comprised of a select group of forward-thinking corporations and non-profits that share ISTE's commitment to improving teaching and learning by advancing the effective use of technology in education. Thinkfinity advances that commitment by offering quality professional development aligned to ISTE NETS for Teachers.

Thinkfinity Professional Development is aligned to the ISTE National Educational Technology Standards for Teachers (NETS-T)

Table of Contents

This guide is designed to help educators use the wide variety of educational resources available on the Thinkfinity Web site. Through helpful explanations, screen-shots, diagrams and suggested activities, this guide will demonstrate what is available, where to find it and how to use it effectively.

Thinkfinity Site Map 2

Common and Unique Features of Thinkfinity Web Sites 3

Search Engine 4

Thinkfinity Professional Development 5

Teacher Resources 5

Arts Integration (ARTSEDGE) 6

Economics (EconEdLink) 12

Geography (Xpeditions) 18

Humanities (EDSITEment) 24

Mathematics (Illuminations) 30

Reading and Language Arts (ReadWriteThink) 36

Science (Science NetLinks) 42

Thinkfinity Framework for Integrating Online Resources 48

Thinkfinity Enhanced Framework for Integrating Online Resources 49

Thinkfinity Integration Plan 50

Technology Definitions 52

Technology How To's 53

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Thinkfinity

www.thinkfinity.org

What is Thinkfinity?

Thinkfinity is the cornerstone of Verizon Foundation's Literacy, Education and Technology initiatives. This free, comprehensive digital learning platform is built upon the merger of two highly acclaimed programs well-known to educators—the program known as Verizon MarcoPolo and the Verizon Literacy Network. Thinkfinity, which means "endless possibilities for learning," is designed to improve learning in traditional settings and beyond the classroom by providing high-caliber content and professional development needed to improve student achievement – anytime, anywhere, at no cost.

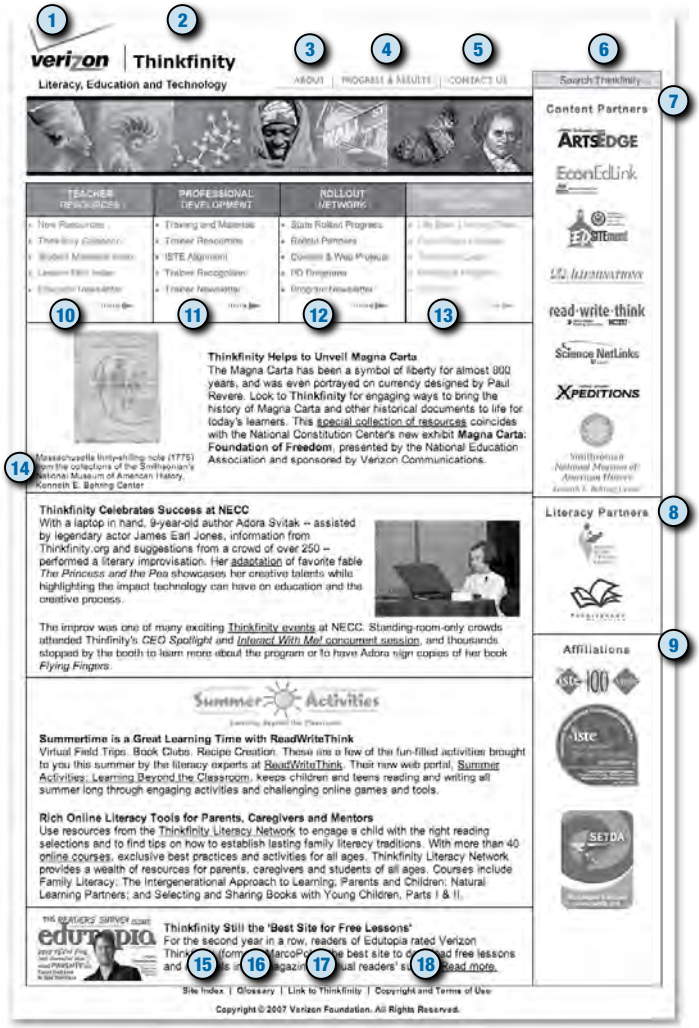
Using the Thinkfinity Homepage

Type **www.thinkfinity.org** in the address line of your Web browser and click Enter or press Return.

The Thinkfinity homepage appears.

The following numbered list corresponds to the screenshot on the right showing the features of the homepage.

1. Access the **Verizon Foundation** Web site.
2. Verizon Foundation **Thinkfinity** Program is Verizon Foundation's signature digital learning platform designed to improve educational and literacy achievement.
3. Learn more **About** Thinkfinity through background information, the online press room and publications.
4. See how Thinkfinity's doing in **Progress & Results**.
5. Access **Contact Us** to submit feedback or ask questions.
6. **Search Thinkfinity** for information and resources from the Content and Literacy Partners.
7. Go to a **Content Partner** site by clicking on its logo.
8. Go to a **Literacy Partner** site by clicking on its logo.
9. Read about our **ISTE 100 membership** and alignment to the National Educational Technology Standards for Teachers.
10. Visit **Teacher Resources** for the newest lessons, student activities, educator newsletters and thematic activities tied to current events.
11. Explore **Professional Development** courses and resources.
12. Check out Thinkfinity's **Rollout Network** to see the reach of Thinkfinity in your state.
13. Link to the **Thinkfinity Literacy Network** for resources to promote literacy in your community.



14. Read current news about Thinkfinity in **Thinkfinity Features**.
15. For navigation assistance, see the **Site Index**.
16. Review the Thinkfinity **Glossary**.
17. **Link to Thinkfinity** from your Web site.
18. Read the **Copyright and Terms of Use**.

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Common and Unique Features of Thinkfinity Web sites

Common Features

A common aspect of every Thinkfinity Partner Web site is that each site presents content within the framework of the four common features: Lessons, Web Sites, Standards and Student Materials. Although they may be named differently, each Partner Site has lessons, a listing of reviewed Web sites, reference to national standards, and materials and interactive tools / activities for students.

Partner Site	Lessons	Web Sites	Standards	Student Materials
ARTSEDGE	Lessons	WebLinks	Standards	Look·Listen·Learn
EconEdLink	Lessons	WebLinks	Standards	Tools in CyberTeach's Teaching Resources
EDSITEment	Lessons	All Web Sites	Standards	Interactives / activities embedded within lessons
Illuminations	Lessons	Web Links	Standards	Activities
ReadWriteThink	Lessons	Web Resources	Standards	Student Materials
Science NetLinks	Lessons	Resources	Benchmarks	Student sheets and Interactives embedded within lessons
Xpeditions	Lessons	Recommended Links	Standards	Xpedition Hall & Interactives embedded within lessons

Unique Features

There are many unique features on the Partner sites. Below you will find a few unique features that have been highlighted.

Partner Site	Unique Features
ARTSEDGE	• How-To's • Spotlights
EconEdLink	• DataLinks • Current Events • CyberTeach • State Standards Correlation
EDSITEment	• Calendar • This Month's Feature • Reference Shelf
Illuminations	• Explorations
ReadWriteThink	• Calendar
Science NetLinks	• Science Updates • Student E-Sheets
Xpeditions	• Atlas • Xpedition Hall • Activities

Thinkfinity Literacy Network

National Center for Family Literacy

PROLITERACY Worldwide

- More than 40 online courses for literacy instructors, community-based organizations, students and volunteers
- Exclusive best practices like the Life Span Literacy Matrix and Literacy Program Self-Assessment Tool
- Activities and instruction for English language learners and ESL instructors
- Searchable databases of hundreds of literacy organizations in need of volunteers
- Studies, research and statistics highlighting the importance of literacy development across the life span

Smithsonian's National Museum of American History

Smithsonian
National Museum of American History
Kenneth E. Behring Center

The National Museum of American History dedicates its collections and scholarship to inspiring a broader understanding of our nation and its many peoples. We create learning opportunities, stimulate imaginations, and present challenging ideas about our country's past.

The Partner site from Smithsonian's National Museum of American History is coming soon. See **http://thinkfinity.org/about/partners.aspx#smithsonian** for more information.

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Search Engine

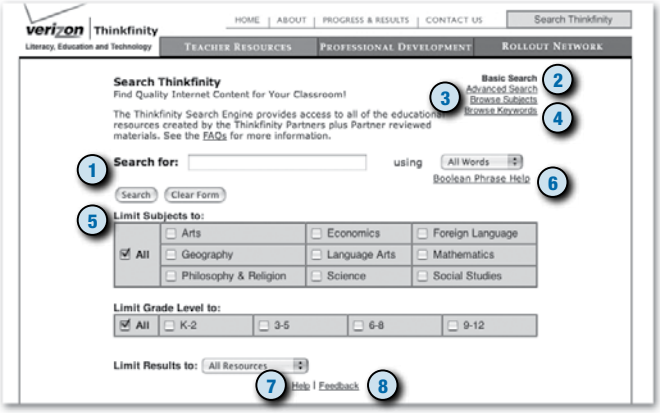
www.thinkfinitysearch.org

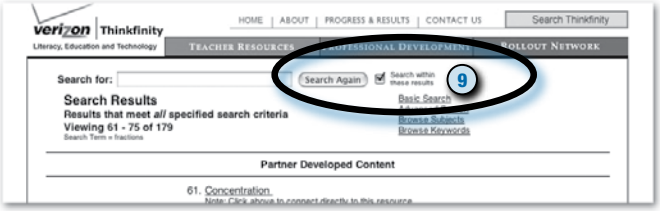
The **Thinkfinity Search Engine** was developed with you, the educator, in mind. Educators often find that using popular search engines to locate classroom resources generates thousands of results, many of which are educationally irrelevant, inappropriate for the classroom and even unsafe for students. By contrast, the Thinkfinity Search Engine produces only high-quality and appropriate results for educators and students, each developed or reviewed by the Partners. To access the Thinkfinity Search Engine, click **Search Thinkfinity** in the upper right-hand corner of the Thinkfinity home page at *www.thinkfinity.org*. You also can access the Thinkfinity Search Engine from the upper right corners on each of the Thinkfinity Content Partner's sites.

Search Thinkfinity

Type **www.thinkfinity.org** in the address line of your Web browser, and click Enter or press Return. Click the **Search Thinkfinity** button on the top right of the Thinkfinity homepage.

1. Conduct a **Basic Search** by entering a subject or keyword and clicking Search.
2. Use the **Advanced Search** option to limit your search by subject, Partner site, grade level or file format.
3. Select **Browse Subjects** to view a list of general subject areas coupled with resources related to the specific subject area.
4. Select **Browse Keywords** for a list of catalogued search terms arranged alphabetically. Click any letter to see a list of keywords beginning with that letter.
5. **Limit** your search to specific subjects and / or grade levels by clicking the boxes that define your interest.
6. Conduct a **Boolean Search** to narrow your search, or use the pull-down menu to search for All Words or Any Words.
7. Click **Help** for assistance on using the Search Engine.



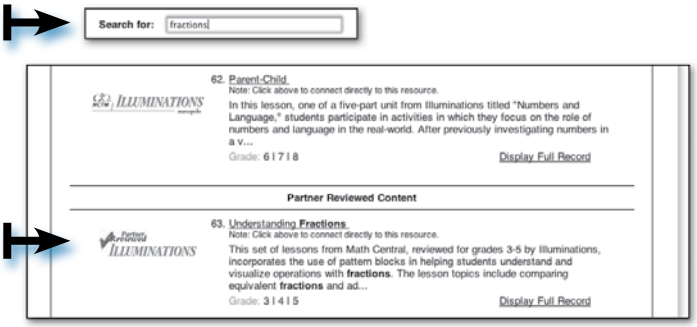


8. Click **Feedback** to let us know how the Search Engine can better meet your educational needs.
9. After conducting a search, place a check next to the box labeled **Search Within These Results** to further refine your next search.

Understanding the Thinkfinity Search Engine

Type your topic or keyword in the **Search for** box, then click **Search** to activate the Thinkfinity Search Engine.

Search results will show a group of resources listed by title. Each result includes a brief description of the resource and its intended grade level(s). Click any title to go directly to the resource, or click **Display Full Record** for more information about the resource. The icon to the left of the description identifies the resource as original Thinkfinity Partner content or content from a site reviewed by a Thinkfinity Partner, designated by a red ✓.



Helpful Hints

- If you know the exact title or phrase of the information you're looking for, place your search words in quotes.
- To search for a combination of keywords or terms, simply leave a space between single words.

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Thinkfinity Professional Development

It is the mission of the Professional Development team to equip educators with the knowledge of the vast array of high-quality, standards-based educational resources Thinkfinity provides. In tandem, Thinkfinity trainings address strategies for effectively integrating these educational resources in classrooms. Thinkfinity offers professional development workshops and courses available both face-to-face and online. Our online courses are accredited and available synchronously or asynchronously. In addition, most courses are eligible for CEU and / or graduate credit.

For more information on our cutting-edge sessions, please visit the Thinkfinity Web Site Professional Development page: *http://www.thinkfinity.org/pd/request_training.aspx*.

Highlights of Thinkfinity's Courses

- Aligned to ISTE's NETS for Teachers
- Available graduate and CEU credits
- Materials included
- Available on-site or online from the comfort of your school / home
- Easily align to your Federal, State and Local Grant Programs

Online Course Teacher Comment

"This was a painless, non-threatening way to learn about integrating technology into my classroom. I enjoyed exploring the content-rich resources that were both user-friendly and accessible. I wouldn't hesitate to recommend this course to other teachers who are looking to expand their ability to integrate technology in their lesson plans."

— Robynn Smith
Classroom Teacher: Newport News, Virginia

Thinkfinity Professional Development and Alignment to the NETS for Teachers

The International Society for Technology in Education reviewed the **Thinkfinity Teacher Training Kit**, **Online Trainer Resource Center and Online Course** and determined that these resources clearly support implementation of the ISTE National Educational Technology Standards (NETS) in a specific, carefully reviewed and documented process. It prepares participants to substantially meet NETS for Teachers. In addition to these items, Thinkfinity also strives to conduct both on-site and Web Conferencing courses consistent with ISTE's NETS for Teachers standards.

Visit www.thinkfinity.org to learn more about Thinkfinity Professional Development.

Teacher Resources

Thinkfinity provides tools for teachers such as the Thinkfinity Calendar, Student Materials Index, Educator Newsletters, Featured Resources, information about Types of Internet Content, Classroom Integration and Technology Tips, Partner Site Overviews and Plug-in information. These tools are available from the **Teacher Resources** section, located on the Thinkfinity homepage.

Educator Newsletters

Educator newsletters are distributed to thousands of educators across the country monthly. These newsletters contain links to featured resources centered around common themes, tips for trainers, and general program information for educators and educational leaders. Share Educator Newsletters with others via e-mail, or print and distribute them.

Thinkfinity Calendar

What happened today in history? Find this out and find associated supporting Thinkfinity lessons and resources through the Thinkfinity Calendar.

Student Materials Index

The Student Materials Index allows educators to easily find all of the Content Partners' student tools, either alphabetically by title, by subject area, by Partner Site, or by grade band.

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ARTSEDGE Mission Statement:

Through the creative use of technology, ARTSEDGE designs and delivers lessons, interactives and multimedia arts experiences that enhance the K-12 educational environment. Offering arts-integrated, standards-based teaching materials, immersive, media-rich interactives for use in and out of the classroom, professional development resources, and guidelines for arts-based instruction and assessment, ARTSEDGE hopes to engage, educate and inspire our nation's teachers and young people in, through and about the arts.

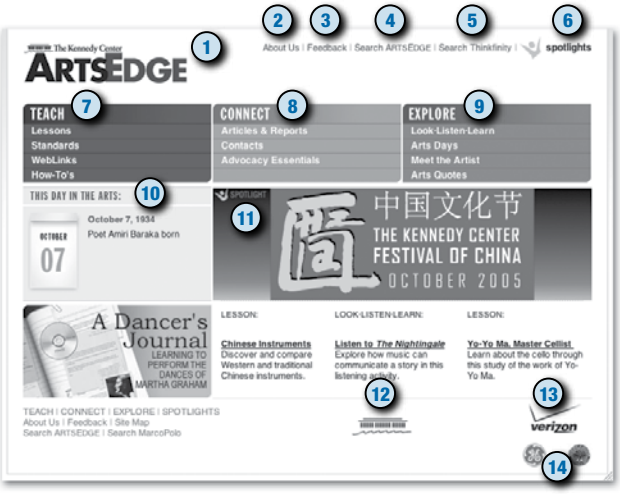
Using ARTSEDGE

From the Thinkfinity homepage, click on the Partner site logo, or type **www.artsedge.kennedy-center.org** into the address line of your Web browser, and click Enter or press Return.

The ARTSEDGE homepage appears.

The following numbered list corresponds to the screenshot on the right showing the features of the homepage.

1. Visit **ARTSEDGE** for arts integration resources within all subject areas and grade levels.
2. Read **About Us** to learn about ARTSEDGE's history and mission. Find out how you can submit lessons.
3. Contact us to offer **Feedback** that will help improve the site.
4. **Search ARTSEDGE** resources by content type and arts subject.
5. Use **Search Thinkfinity** to search ARTSEDGE and all Thinkfinity Partner sites.
6. Explore the **Spotlights** archive to find collections highlighting ARTSEDGE resources devoted to a particular theme.
7. Explore the **Teach** section for arts-integrated lesson plans, the National Standards for Art Education, reviewed WebLinks and How-To's that help bring the arts into the classroom.
8. The **Connect** section gives users access to ideas, tools and people that support the role of the arts in education.
9. The **Explore** section is a collection of multimedia interactive, media-rich activities to help teachers and students discover the world of the arts, in both integrated and "arts for arts sake" approaches.
10. **Arts Days** provides a daily calendar of notable people and events in the arts.
11. The **Featured Spotlight** brings increased visibility to a selected collection and gives easy access to the resources it contains.



12. Access the **Kennedy Center** homepage.
13. Access the **Verizon Foundation** site.
14. ARTSEDGE is also supported by the **GE Fund** and the **US Department of Education**.

About the Kennedy Center's Education Department

As America's national center for the performing arts, The John F. Kennedy Center for the Performing Arts is committed to arts education. Through programs for the local community and across the nation, the Kennedy Center's Education Department directly serves more than 11 million people.

Much of the work of the Kennedy Center's Education Department is based on the principle that the arts[1] are essential disciplines that must be included in the core curriculum.[2] When the arts are included, they have the ability to transform the learning environment and positively impact student learning.

1. The term "arts" includes music, visual arts, dance / creative movement, drama / theater, poetry, creative writing, puppetry, storytelling, media arts and folk arts.
2. The US Department of Education has recognized the arts as "core subject areas" in the 2002 reauthorization of the Elementary and Secondary Education Act (ESEA).

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ARTSEDGE: Features

artsedge.kennedy-center.org

Inside the ARTSEDGE Web Site

Common Features

Lessons

The **Lessons** link connects you to lessons that integrate the arts across the curriculum, with clear learning objectives targeting the National Standards for Arts Education and national standards in other subjects. Lessons can be filtered and / or sorted by title, arts subject, other subject or grade band. Lessons are easily searched using the **Lessons Quick Search** on the index page, or by using the **Advanced Lesson Search**. All lessons feature student materials and an assessment component to provide clear measurement of learning in both the arts and other subject areas.

Standards

ARTSEDGE is the online home of the National Standards for Arts Education. The **Standards index** allows you to view, sort and filter by arts subject or grade band. Click on a standard to access in-depth content and achievement standards and supporting text outlining goals and objectives for each discipline in each grade band, as well as a list of lesson plans and other resources that address that standard.

Student Materials

The **Explore** section provides a variety of materials designed for use by and with students. It features printable **Arts Quotes**, a searchable calendar of **Arts Days** featuring notable people and events in art history, in-depth **Meet the Artist** interviews and media-rich "deep interactives" in the **Look·Listen·Learn** section.

The Thinking Behind Our Lessons

What is Arts Integration?

School curriculums have traditionally been structured to provide students with opportunities to separately study each of the disciplines. There is great merit to this specialization and work within a discipline; equally important, however, is to bring wholeness to student study. Young people must have opportunities to see how disciplines meet, overlap and inform each other, as well as to make creative connections to the world around them. The arts provide an excellent vehicle for exploring these connections.

We define arts integration as instruction that makes natural and significant connections between academic subject areas (for example, science, social studies, language arts, math, etc.) and an art form. Students master learning objectives in both the subject area and the art form; teachers design instruction that makes use of these connections to enhance student learning. Arts-integrated study is intellectually and creatively rigorous and complements, but does not replace, subject area instruction—including discipline-focused education in the visual and performing arts.

WebLinks

Found in the **Teach** section, the **WebLinks** database contains a vetted collection of expert-reviewed Web sites that are sortable by arts subject or resource type. In the **Connect** section, the **Contacts** database provides a searchable list of organizations and people who support the role of arts in education.

Unique Features

Spotlights

Spotlights feature thematic groupings of resources drawn from across the ARTSEDGE collection. They bring together lessons, interactives and other materials in themes as diverse as classical music, theater and photography, so teachers have easy access to materials that go together.

How-To's

These articles are designed to provide tools to help teachers consider the theory and practice of arts-integrated instruction. **How-To's** provide easy-to-follow methods and guidelines for arts-based instruction, assessment and management of the arts-infused classroom.

Three Basic Approaches To Arts Integration

artsedge.kennedy-center.org

Generally, arts-integrated instruction has three basic approaches: 1) teaching *subject area content* through the arts, 2) *teaching skills* through the arts, and / or 3) teaching about *the arts and other subject areas* through an interdisciplinary approach. The following scenarios provide examples of each of these approaches.

Teaching Scenario 1:
Teaching Subject Area Content Through the Arts

Setting the Stage

By focusing on natural connections between subject areas and the arts, students have opportunities to demonstrate their knowledge and understanding through creative work. In other words, the arts can serve as a way for students to express their understanding of content from another subject area. Mrs. Redd is a lower elementary teacher who would like her students to recognize different literary elements in a story. She would also like to address several higher-order thinking skills in a non-traditional way with a performance-based assessment.

1 To start, Mrs. Redd goes to the ARTSEDGE search engine and clicks on the "**Try our Advanced Lesson Search**" link at the bottom of the page. She searches for lessons in the database that incorporate theater, language arts and K-4 by clicking the boxes in each category; the search returns more than 25 lessons that meet this criteria. After reading through them she discovers the lesson **Comparing Tales Through Performance**. She is thrilled as all her students are familiar with fairy tales and *The Three Little Pigs*. An added bonus is the accompanying modern version of this fairy tale *The Three Little Wolves and The Big Bad Pig* that is also used in the lesson.

2 She prints the lesson to read through. This way she can plan exactly how she will execute this lesson. She also discovers that ARTSEDGE provides her with printable handouts on the sidebar. These are the accompanying scenario cards, vocabulary words, Venn diagrams and rubrics.

3 In the first part of this ARTSEDGE lesson she is asked to choose a short story to read to the students. She chooses *Stella and Roy* written and illustrated by Ashley Wolff, a remake of the classic tale of *The Tortoise and the Hare*. They discuss the different literary elements and use the story as reference.

4 She then uses *The Three Little Pigs* and *The Three Little Wolves and The Big Bad Pig* to continue the process by using the strategy of comparison and the tool of performance. In doing this she is able to check for **knowledge** by observation and student recall of information from the story. She is able to check for **comprehension** by seeing if they can translate this knowledge into the new story about *The Three Little Pigs* and *The Three Little Wolves* and *The Big Bad Pig*. She also checks for **analysis** by seeing if they recognize patterns or hidden meanings in the stories.

5 Continuing on, Mrs. Redd can observe whether her students are able to recognize and discuss similarities and differences in the stories by using the Venn diagram, in the handouts. Giving the students performance tasks of role-play and improvisation of characters and scenes, she will know if they are able to **apply** the information they learned, **synthesize** information by using old ideas to create new ones and **draw conclusions**, and finally **evaluate** what they have done and learned through the entire experience.

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Teaching Scenario 2: Teaching Skills Through the Arts

artsedge.kennedy-center.org

Setting the Stage

Cross-curricular skills can also be developed through student engagement in the arts. Miss Blue, a language arts teacher in a suburban middle school, is looking for extensions for her thematic unit for October, focusing on scary literature—works by Poe, Shelley and others. Using the ARTSEDGE search engine, she enters the keyword "spooky" and is pleased to find the lesson **Haunting Music,** which will complement and extend her theme.

1 In this lesson about music that is inspired by the spooky and bizarre, students learn about orchestra program music by exploring the works of Hector Berlioz and Camille Saint-Saëns. Students will learn about *Symphonie Fantastique* and *Danse Macabre*, identify and analyze the musical terms and concepts in each piece, and write a short story and create a class mural based on their listening experiences.

2 Given her timeline and the other literary connections Miss Blue already hopes to cover, she drops the mural-making project and further integrates the lesson's story writing component with her own existing plans.

3 She follows her main lesson plan, expanding on the study of Romantic-period authors to include artists working in many mediums. She shows several paintings from the 1800s, and begins a discussion of the ways that artists of the period (including poets and writers) explored and tried to evoke strong emotion—including fear and horror—in their works. She uses her classroom computer and projector to show the video clips embedded in the lesson, which feature National Symphony Orchestra Assistant Conductor Emil de Cou introducing and discussing passages from the pieces. She can access these from the sidebar under **Materials**, and they are also embedded in the lesson. The clips add another "voice" to her teaching and allow students to get a glimpse of the thinking behind the composition.

4 Noticing the deep engagement of many of her students, she visits iTunes Music Store, clicks iMix and searches for "ARTSEDGE." She finds ARTSEDGE's companion iMix for **Haunting Music** at *http://phobos.apple.com/WebObjects/MZStore.woa/wa/viewPublishedPlaylist?id=510193*

5 There she can play short music clips from many other scary music pieces. She selects several for download, deciding to use these as background music during in-class writing periods. Realizing the possibilities of making stronger connections across the arts, she decides to revisit her plans for next October and to research more creepy connections through more advanced listening activities and other fully-integrated arts experiences.

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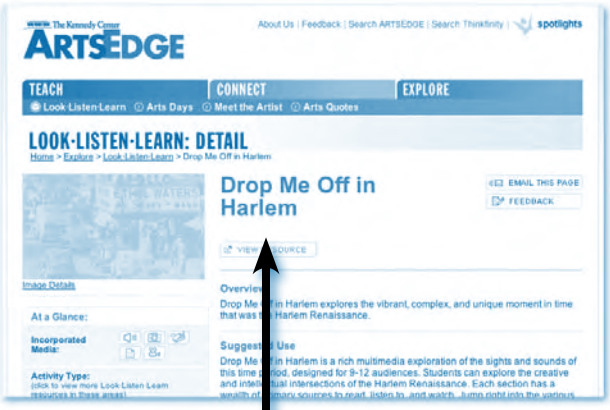
Teaching Scenario 3: Teaching About the Arts and Other Subject Areas Through an Interdisciplinary Approach

artsedge.kennedy-center.org

Setting the Stage

The arts can illuminate units of study by providing perspective on history or culture and by showing how people create and communicate meaning. Mr. Green, an American History teacher in an urban high school in Chicago, is crafting a unit on the early 20th century and is looking for a new way to teach the main objectives and standards associated with his course. He understands that his students need to know how to analyze chronological relationships and patterns and to understand historical perspective throughout the course. In addition, he would like to make his students aware of the importance of social networks and to put a new "face" on the historical events he normally teaches.

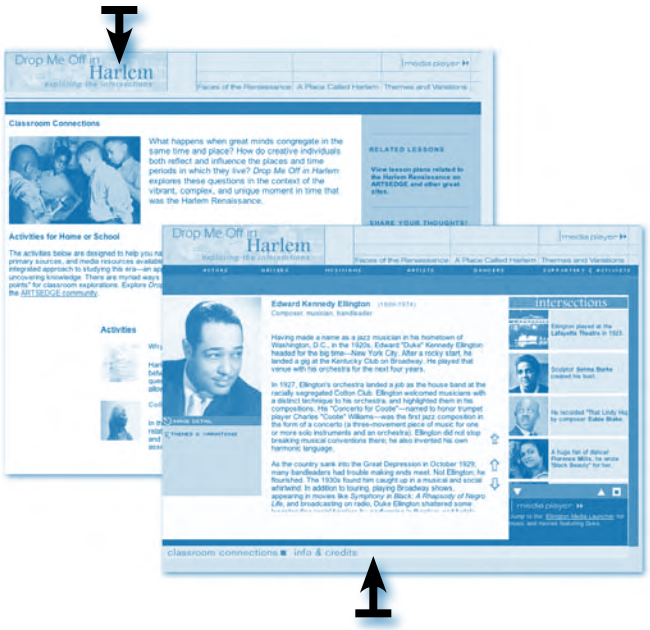
1 Mr. Green recently attended a professional development class that delved into arts integration as a way to teach the curriculum. He sits down at his computer to begin researching information on the first part of his course, "The Harlem Renaissance." He accesses the ARTSEDGE homepage and clicks **Search Thinkfinity** in the top right of the page. He begins looking at the online resources. He wants a site that will encourage his students to think critically about what they will view and listen to. He searches for a site that is from a reputable source, not a personal site—one that will offer him resources that he knows are reliable and presented in an educational context. He needs a site that presents thought-provoking media and the pure written word, the actual item and not an interpretation. He needs to know that where he sends the students to on the Web is accurate, complete in its presentation, and not biased.



2 He sees the **Drop Me Off In Harlem** site on ARTSEDGE and decides to explore using it in his lesson. He immediately knows he has found the core piece for his course. Each of the sections of the site — Faces of the Renaissance, Themes and Variations, Classroom Connections, Media Player and A Place Called Harlem — intersects in some way, illustrating the connections between the physical place, Harlem, and its residents. The interactive multimedia piece explores the time period and criss-crosses creative intellectual intersections inclusive of diverse voices and perspectives.

3 The site has all the components he needs for the students to do their research:

a. **Classroom Connections** has two activities that the students could access, follow directions, and complete on their own. It also has numerous lesson plans that he can use either as a whole lesson, or in portions of the lesson to emphasis content he wishes to focus on. He is particularly excited to see that the lessons are not only lessons ARTSEDGE provided, but also lessons from other sources that have been vetted as exceptional lessons.



b. Accessing the section **Faces of the Renaissance**, he discovers separate sections for actors, musicians, writers, artists, dancers, and supporters and activists. Each section features various personalities associated

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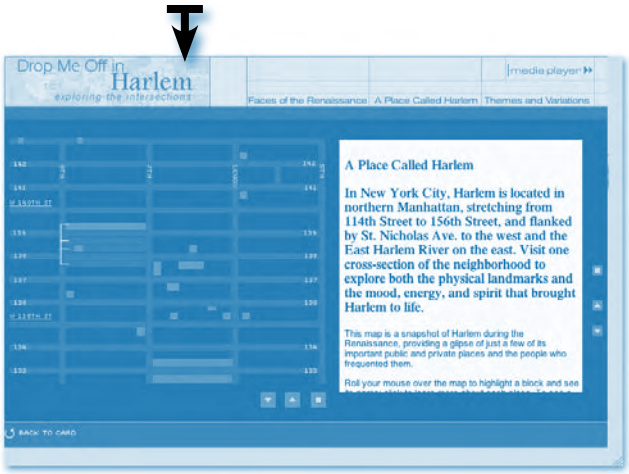
with the category but also shows their connections and intersections with others in Harlem and how they meshed and intertwined in their life, careers and dreams. His students can investigate through primary source documents how their collective and individual voices reflected and shaped the era.

c. They can actually experience Harlem by viewing the interactive map in the section **A Place Called Harlem**. This will give them a feel for the actual hardscape of the land and buildings. This small area called Harlem and the vibrant, complex genius of its citizens produced a wealth of creativity in all areas of life.



d. In **Themes and Variations** students can take a closer look at the Harlem Renaissance and discover how and why the arts flourished by reading various essays and accompanying primary source materials.

e. He is amazed that his students can view the sites and the sounds of the Harlem Renaissance through primary source materials in all areas of the arts (Visual Art, Music — both vocal and instrumental — dance, drama, and literature) by accessing the **Media Player** section.

4 Mr. Green prints out the lessons he will use and makes notes on the **Drop Me Off In Harlem** Web site. He begins planning his weeklong lesson using this site as his primary resource. He books time in the computer lab so students will have their own computers. He begins to create a scavenger hunt type document that the students can use as they search the Web site for the answers, and creates cooperative groups to work on the two suggested activities. He feels that he has successfully accomplished his goal of having his students learn to analyze chronological relationships and patterns and to understand historical perspective involving the Harlem Renaissance and has done so using one Web site.

> **"Engaging the 'multi-media generation' in higher-order thinking is a snap with ARTSEDGE's Drop Me Off in Harlem. Less computer-savvy teachers are sure to be comfortable using the Classroom Connection and following the site's easy navigation."**
>
> — Sandra Hornig
> Tech in Motion – Alabama Department of Education, 2002 Thinkfinity Field Trainer of the Year

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EconEdLink

National Council on Economic Education

www.econedlink.org

EconEdLink Mission Statement

Based on the essential principles of economics, EconEdLink provides a premier source of classroom tested economic lesson materials for K–12 teachers and their students, produced by the National Council on Economic Education.

Using EconEdLink

From the Thinkfinity homepage, click on the Partner site logo, or type **www.econedlink.org** in the address line of your Web browser, and click Enter or press Return.

The EconEdLink homepage appears.

The following numbered list corresponds to the screenshot on the right showing the features of the homepage.

1. Visit **EconEdLink**, a premier source of Internet-based economics lesson materials.
2. Learn about the *Voluntary National Content* **Standards** *in Economics*. Discover the connection between your state economic standards and the NCEE Voluntary National Content **Standards** in Economics.
3. **Contact** EconEdLink to share comments or ask questions.
4. **Search** EconEdLink and all of the Thinkfinity Partner sites.
5. Find a **Lesson** that matches keyword, lesson type, and grade level criteria.
6. Consult **CyberTeach** to learn more about ways to use the Web to inform and enliven any economics curriculum.
7. Select **Current Events** for links to recent news stories and related lessons.
8. Go to **DataLinks** for quick access to key up-to-date economics data and simulations to use the data in the classroom.
9. **WebLinks** connects you with expert-reviewed sites for economic education resources.
10. Use **Quick Search** to find economic lessons that have been written for the listed economic concepts.
11. Stay informed by joining the **EconEdLink Newsletter**.

12. Access the **Thinkfinity** Web Site.
13. Access the **Verizon Foundation** Web site.
14. Visit the **National Council on Economic Education** site.

NCEE Mission Statement

The mission of the **National Council on Economic Education** (NCEE) is to help all students develop the real-life skills they need to succeed: to be able to think and choose as knowledgeable consumers, savers and investors, responsible citizens, productive members of the workforce, and effective participants in a global economy. For over 50 years, NCEE has been fulfilling this mission through the development of standards, curriculum, instructional materials, and assessments, and through teacher training, research, and advocacy.

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EconEdLink: Features

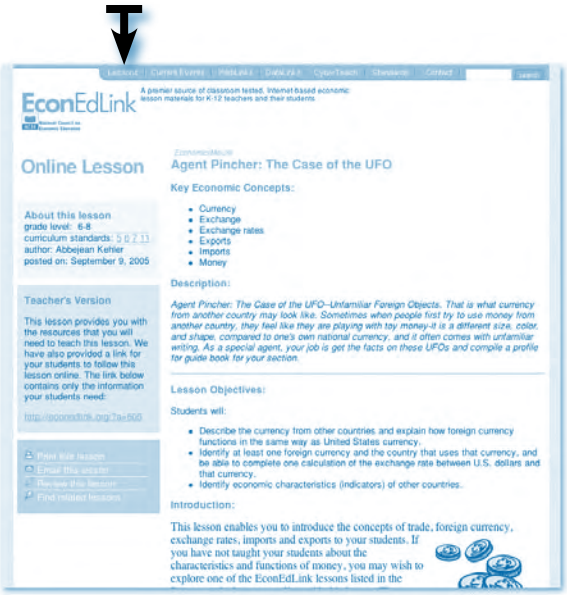
www.econedlink.org

Inside the EconEdLink Web Site

Common Features

Lessons

Click on **Lessons** to access a database of all the lessons on the site, searchable by title, grade, standard, or lesson type. The teacher version appears first with an abbreviated link to the student version on the left side of the teacher version. A printable version of each lesson also is available in both the student and the teacher version.



The Thinking Behind Our Lessons

A typical EconEdLink lesson has links to newspapers and news sites, interactive activities, discussion questions, and interpretations of graphs and other data. An EconEdLink lesson has two versions: a student's version and a teacher's version that includes much of the information that a teacher needs to teach effectively using the lesson.

Standards

To learn more about the *Voluntary National Content Standards in Economics* developed by the National Council on Economic Education, use the **Standards** link in the top navigation bar.

Student Materials

An EconEdLink lesson can be found in four formats:

- **EconomicsMinute**, designed to take less than a class period to complete and is to cover economic issues that are current.
- **MillionaireMinute**, also designed to take less than a class period to complete and is to cover personal finance issues.
- **Netnews Line**, designed to be completed in more than one class period and covers general economic issues.
- **CaseStudies**, designed to take a class period to complete and covers the current economic indicators that are updated on a monthly basis.

Web Links

You will discover a selection of Web sites that have been chosen and reviewed by members of the **EconEdLink Review Board** to support economics instruction at WebLinks.

Unique Features

Datalinks

Access up-to-date macroeconomic data for classroom use, including primary source materials, charts and simulations. **Datalinks** is driven by economic indicators and is constantly updated.

Current Events

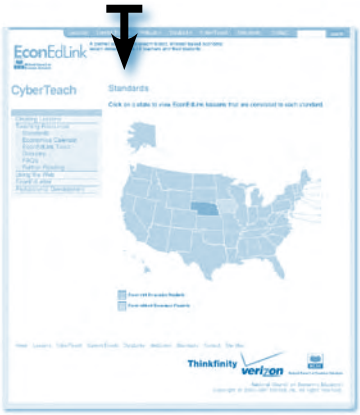
The links on the **Current Events** page provide up-to-date economic news and are continuously updated.

CyberTeach

CyberTeach is a comprehensive guide to teaching economics using the Internet, including model lessons and templates for creating effective lesson plans.

Standards Correlated to States

NCEE has correlated state economic standards to the *Voluntary National Content Standards in Economics*. The **Standards** link provides a map of all 50 states and a link to each of the states that has a correlation between that states economic standards and the *NCEE National Voluntary Economic Standards*. This correlation provides the user with a link to lessons on EconEdLink to help address the state standard.



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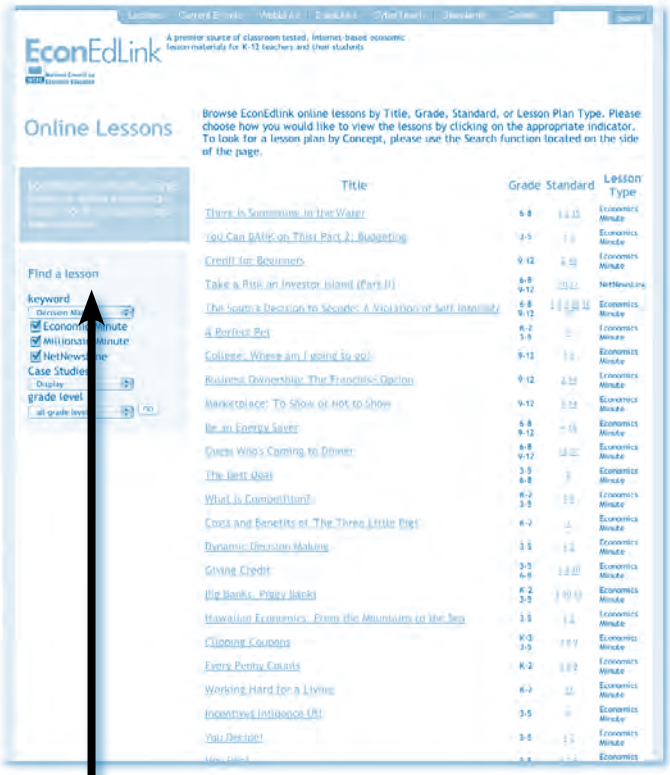
Teaching Scenario: Elementary

www.econedlink.org

Setting the Stage

Mr. Johnson is a first grade teacher who plans to introduce a unit of study on decision making with his first graders. Mr. Johnson has taught this unit for several years and is interested in approaching the lesson from an economic perspective. Mr. Johnson discovered that EconEdLink allows him to do a Quick Search for lessons using economic concepts. He began his search by selecting decision making as his concept. This provides a listing of over 30 lessons that present economic content on decision making. Mr. Johnson is able to narrow his search to the K-2 grade band and finds 14 lessons for his first grade students.

Mr. Johnson's school has several computers in his classroom. His students spend time every day using the computers. They have become quite familiar with online learning.



1 With the listing of lessons that present an economic perspective for decision making, Mr. Johnson is able to peruse the lessons and find one that meets his objectives. He looks for an online lesson that his students can work on in pairs. He finds a lesson that uses the idea of building a community and the economic choices that go into this process. He likes the many decision making opportunities in the lesson. Since they were also studying communities in social studies, this is the hook for his students' study of decision making.

2 **Build Your Community** is an EconEdLink lesson that guides students through the study of a variety of businesses and the service they provide to a community. Students build a town selecting seven businesses they feel are the most important to have to live in this community. This information is foundational and necessary for students to make responsible decisions in their role as citizens.

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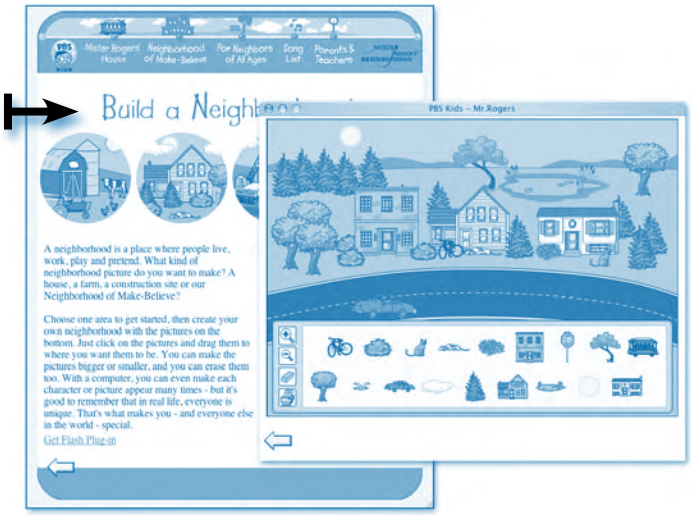
Teaching Scenario: Elementary *continued*

www.econedlink.org

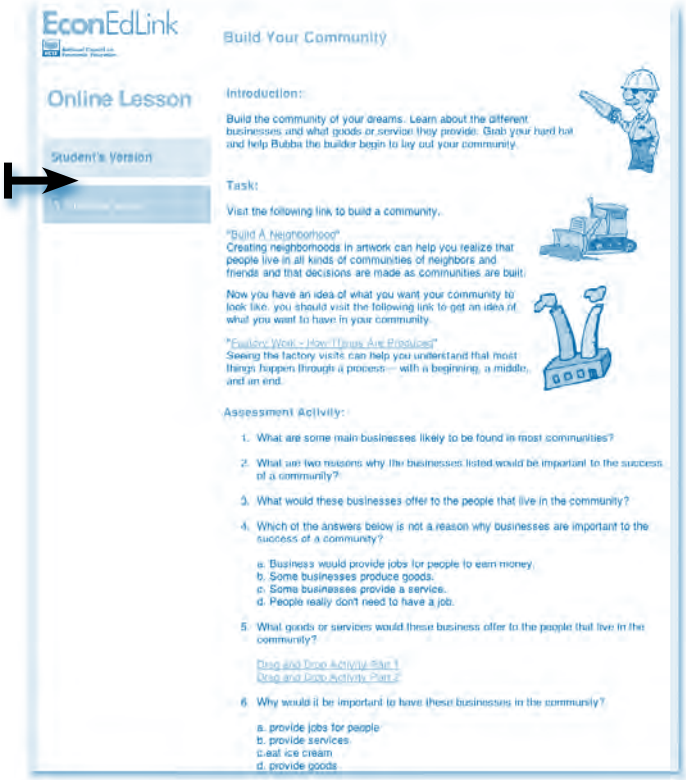
Mr. Johnson continues to explore the teacher's version of the lesson. He is able to see Internet resources to which he is going to send his students. These include a link to **PBSKids** at *http://pbskids.org/rogers/R_house/build.htm.* This link provides several interactive activities to get his students thinking about the decisions that go into building a community. Several additional interactive activities can be found in this lesson as well.



Mr. Johnson is able to very quickly go through the lesson by using the teacher's version of this lesson plan. This allows him to be prepared for any questions his students might raise. He also notes that all of the resources available through the teacher's version, students will have access to through the student's version. With the help of the teacher's version, and the accompanying student's version he feels prepared to have his students study the economics behind decision making.

Mr. Johnson is prepared to deliver this lesson to his students.

3 Mr. Johnson introduces his students to decision making by discussing the talking points provided in the teacher's version. Mr. Johnson then has his students go to the student page of the lesson found at *http://econedlink.org/?a=285* – this URL is provided in the teacher's version. He bookmarks the student page so his students can find it easily. This student's version does not have any navigation to allow his students to get back to the **Teacher's Version** where answers to the questions are located. The student's version allows them to explore the economic concepts online. The students are divided into work groups and begin their study at the computers.



Once his students complete the online lesson, he initiates a concluding discussion of the information that his students explored and learned from. With both tools the teacher is better able to present the economics that are evident in decision making.

4 Mr. Johnson notes that on the teacher page there was a great extension activity that provides the opportunity for his students to involve their parents in the study of decision making. Titled **At Home Project**, it is designed to have the students build a 3-dimensional model of the town in which they live. They may use various materials (for example, milk cartons and shoe boxes) depending on what is available.

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Teaching Scenario: Secondary

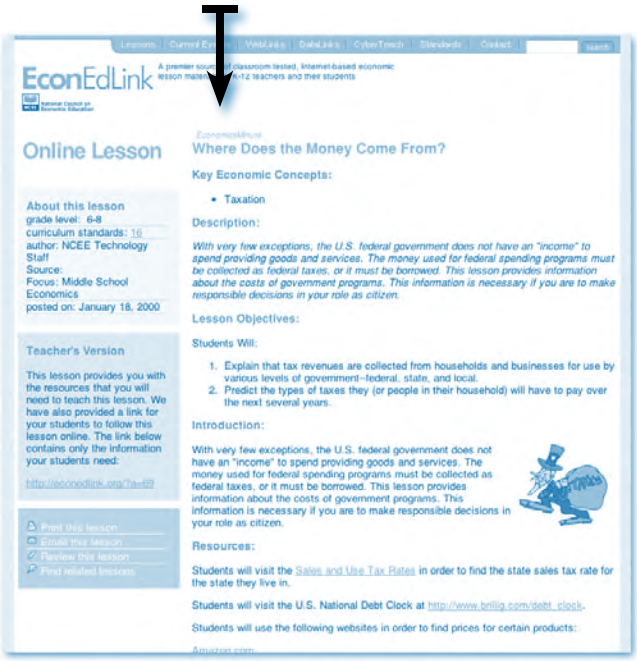
www.econedlink.org

Setting the Stage

Ms. Adams is a middle school teacher who plans to introduce a unit of study on the United States Government and how it is funded. Ms. Adams has taught this unit for several years and is interested in providing more of an economic slant to her lesson. Ms. Adams discovered that EconEdLink has many resources that supplement not only her own understanding but that of her students as well. She knows that there are economic Current Event articles, and DataLinks that provide current economic data that she and her students can use in the classroom. Ms. Adams' school has several computer labs that she and her students can use.

1 Ms. Adams begins her search by going to **CyberTeach** on EconEdLink's homepage. **CyberTeach** contains many resources that can help an educator present economics. There is an **Economic Glossary**, **Economic Calendar**, a link to **State Correlated Standards**, and an index of **Economic Tools**. Ms. Adams chooses the **Economics Calendar** (under the Teaching Resources section) to begin her search for a hook that can grab her students' economic attention. By clicking on **October** she was able to discover that on October 3, 1776, the U.S. took out its first loan. Needing funds to finance the American Revolution, Congress approved a 5 million dollar loan with a 4% interest rate. This started her discussion on the funding of the United States Government. From this hook she was able to narrow her search on EconEdLink.

2 Ms. Adams was able to go to the **SEARCH** window on EconEdLink and type in "taxes." This search provided several EconEdLink lessons on taxes. One middle school lesson was entitled **Where Does the Money Come From?**



3 **Where Does the Money Come From?** is an EconEdLink lesson that establishes the premise that with very few exceptions, the U.S. Federal Government does not have an income to spend providing goods and services. The money used for federal spending programs must be collected as federal taxes, or it must be borrowed. This lesson provides information about the cost of government programs. This information is necessary to make responsible decisions in your role as citizen. With this premise in mind, Ms. Adams continues to explore the teacher's version of this lesson. She is able to see

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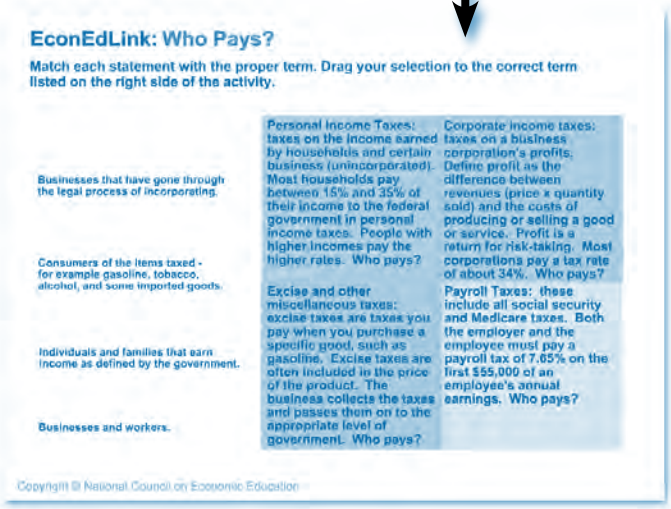
Teaching Scenario: Secondary *continued*

www.econedlink.org

these Internet resources to which she is going to send her students. These include a link to:

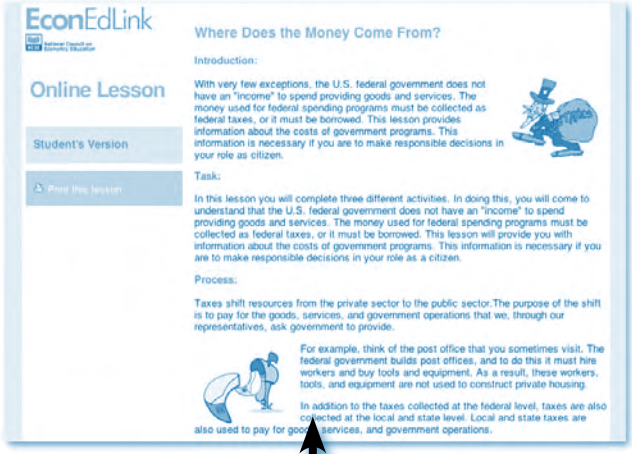
- **Sales Tax rates**
  http://www.salestaxinstitute.com/sales_tax_rates.jsp
- The **U.S. Debt Clock**
  http://www.brillig.com/debt_clock/
- An **interactive activity** found on EconEdLink
  http://www.econedlink.org/lessons/em69/popupActivity.html



Ms. Adams is able to very quickly go through the lesson by using the teacher's version. What she is able to do on the teacher's version is provided for her students in their version.

Ms. Adams is prepared to present this lesson to her students. She decides to wait until October 3rd so her hook has more impact.

> **"As an elementary school teacher, I never thought of myself as an economics teacher. Once I saw the powerful everyday applications of mathematics on your site I was a believer!"**
>
> — Melissa Kath
> Grade 2 Teacher: St. Paul, Minnesota



4 October 3rd arrives and Ms. Adams takes her class to the computer lab. She begins her lesson with the **Economic Calendar** from EconEdLink and points out the economic data that she discovered. Ms. Adams then shows the class the **U.S. National Debt Clock** to generate a more contemporary discussion on the issues facing the United States. Ms. Adams then has her students go to the student page of the **Where Does the Money Come From?** lesson found at *http://econedlink.org/?a=69*. This url is provided for her on the teacher's version. The students are able to go to the lesson and individually go through each of the steps of the online lesson. This student's version does not have any navigation that allows her students to get back to the teacher's version where answers to questions are located. The student's version allows the student to explore the economic concepts online. Once her students complete the online lesson, she is able to discuss the information from which her students explored and from which they learned. With this foundation established, Ms. Adams can continue with her planned curriculum.

Xpeditions Mission Statement

Xpeditions, produced by the National Geographic Society, is home to the US National Geography Standards and to thousands of lessons, ideas, tools, and interactive adventures that bring them to life. Xpeditions aims to provide an engaging teaching and learning environment for exploring our world.

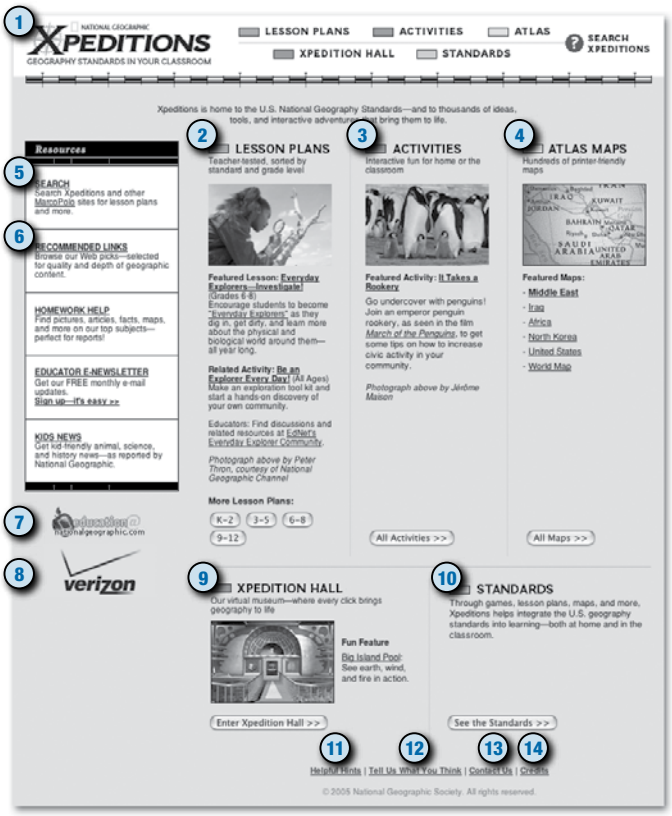
Using Xpeditions

From the Thinkfinity homepage, click on the Partner site logo, or type **www.nationalgeographic.com/xpeditions** in the address line of your Web browser, and click Enter or press Return.

The Xpeditions homepage appears.

The following numbered list corresponds to the screenshot on the right showing the features of the homepage.

1. Visit **Xpeditions** for resources and lessons aligned to the National Geography Standards.
2. Sort **Lesson Plans** by title, grade level, or standard to find rich lessons to meet your classroom needs.
3. Engage students in exciting geography missions using standards-based **Activities** for both in-class and at-home use.
4. Discover more than 1,200 up-to-date printable maps in the interactive **Atlas**.
5. **Search** Xpeditions and all of the Thinkfinity Partner sites.
6. Check our **Recommended Links**, the best online destinations for teaching and learning about geography.
7. Visit the **NationalGeographic.com** Web site.
8. Access the **Verizon Foundation** Web site.
9. See geography come to life in **Xpedition Hall**, an immersive virtual museum.
10. Click **Standards** to view and learn more about the 18 US National Geography Standards.
11. Learn **Helpful Hints** for navigating the site.



12. Click **Tell Us What You Think** to help make the site better using our online survey.
13. **Contact Us**.
14. View **Credits** to see the team behind Xpeditions.

NGS Mission Statement:

For more than a hundred years, the **National Geographic Society** has pursued its mission to increase and diffuse geographic knowledge. The Society has made a special effort to support this goal by establishing the Education & Children's Programs department, which works to motivate and enable each new generation to become geographically literate.

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Xpeditions: Features

www.nationalgeographic.com/xpeditions

Inside the Xpeditions Web Site

Common Features

Lessons

Click the **Lesson Plans** box to navigate to an index of all lessons on the site. The lessons are sortable by title, grade level, or standard. From individual lesson pages, you may select other lessons in the same standard by using the grade band radio buttons and title drop-down menu.

Standards

Click **Standards** for an introduction to and overview of all 18 US National Geography Standards. From there, you can access the complete list of standards. Then visit any individual standard by clicking a number in the index or in the top navigation bar. On each standard page, the left navigation gives suggested lessons, activities, and a related Xpedition Hall exhibit.

The Thinking Behind Our Lessons

All Xpeditions lessons and activities are created by and for classroom teachers. Following a multi-step review process, content is planned around timely, relevant topics in geography and aligned to the US National Geography Standards. These topics are developed into lessons by teams of teachers, skilled in the use of Internet content, who can bring the themes to life in the classroom. Each lesson is reviewed by geography experts and master classroom teachers. Lessons go through several rounds of editorial review before being posted to the **Xpeditions** site.

Student Materials

Virtually every area of the site provides opportunities for students to engage in geographic thinking and learning—from interactive activities and photo galleries embedded in lessons to Xpeditions Activities to the interactive **Atlas** and **Xpedition Hall** (see descriptions below).

Web Links

When you click **Recommended Links**, you'll find expert-reviewed Web site links along with short audio descriptions by a classroom expert. Use these links as a starter set for your own geography bookmark collection.

Unique Features

Atlas

The online, interactive atlas is one of the most widely used resources on Xpeditions. Click on **Atlas** to access more than 1,200 maps at multiple levels of detail. Start by clicking any continent; then continue selecting from countries, provinces, and states until you find what you need. Each map is available in detailed or plain outline. Maps can be selected with borders on or off. Teachers and students may download the maps in GIF or PDF format for use in presentations and classroom instruction.

Xpedition Hall

Xpedition Hall offers a multidimensional tour of geography activities and exhibits, organized according to the US National Geography Standards. These unique activities can be used to complement a lesson plan or simply to excite student interest. Click **Xpedition Hall** and review the Teacher's Guide. Begin touring by using the arrows at the bottom of the page for a 360-degree view. Alternatively, use the interactive floor plan to see what is available in each exhibit or simply select the related standard in the top navigation bar. Once in an exhibit, click the screen to interact with the dynamic device. Try on a pair of *Culture Goggles* or meet a long lost cousin at *The Dig!*

Activities

Xpeditions **Activities** provide family-friendly, student-centered missions through which students learn about topics ranging from world cultures to natural disasters.

Teaching Scenario: Secondary

www.nationalgeographic.com/xpeditions

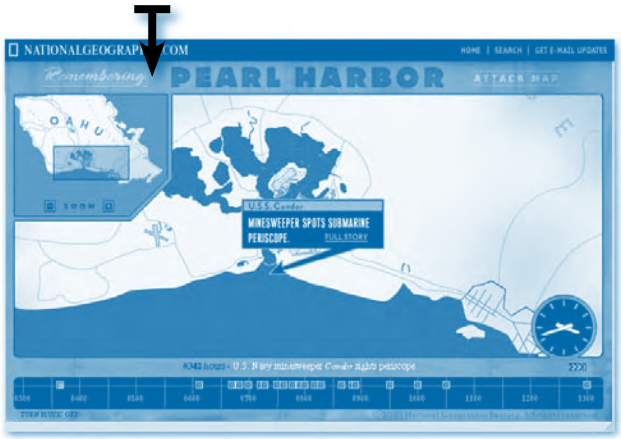
Setting the Stage

Ms. Walker, a tenth grade history teacher, is planning a multi-day lesson about the attack on Pearl Harbor concurrent with Pearl Harbor Remembrance Day, December 7th. While she is generally pleased with how the class textbook presents the information, she knows from experience that her students are more engaged when she couples the textbook with dynamic and more personally relevant resources. Her classroom has two computers with Internet access. For whole-class instruction she connects her computer to the classroom TV.

1 Ms. Walker begins her search by clicking on the **Xpeditions** logo on the Thinkfinity homepage. She clicks **Search Xpeditions** and types "Pearl Harbor" in the box. Several lesson plans and other resources of interest appear in the list of search results. She wants students to learn that preparedness for and prevention of violence comes in part from understanding the nature of conflict through lessons from the past. She expects students will particularly relate to this because of parallels to the 9/11 terrorist attacks.

2 Her search leads her to a video clip, **Video: Excerpt from National Geographic Channel's Pearl Harbor**, which includes President Franklin Delano Roosevelt reading his moving war address along with some poignant stories from soldiers about the horrors of the attack. Ms. Walker decides to begin class by playing the clip, stopping it just before the President identifies the attacking nation. She asks her students if they can identify the famous attack described by the president in the video. She allows students to share what they know before playing the remainder of the video clip.

3 Ms. Walker follows up by giving an overview of events in the hours leading up to and during the attack. She uses another resource from the **Xpeditions Search** results, a multimedia map, **Remembering Pearl Harbor: Attack Map**, from **National Geographic's Pearl Harbor** site. The map and accompanying interactive timeline help students understand how all the elements of the attack came together. After the whole-class presentation, she has students explore the site in small groups.



4 The following day, Ms. Walker guides students in exploring the historical background and causes of the conflict between the United States and Japan. She engages them in considering the United States' level of preparedness for the attack. To provide students with multiple perspectives, she supplements the class textbook with the multimedia resources embedded within the lessons **Was the United States Ready for Pearl Harbor?** and **Getting Involved in War**, two of the lessons she found in her search in step 1. She finds that these images, media clips, and primary source documents both engage students and provide excellent launching points for their own research. To broaden their understanding of conflict, Ms. Walker directs students to the interactive exhibit in Xpedition Hall called the **Advisory Board**, which explores forces for cooperation and conflict through other notable events in the last century.

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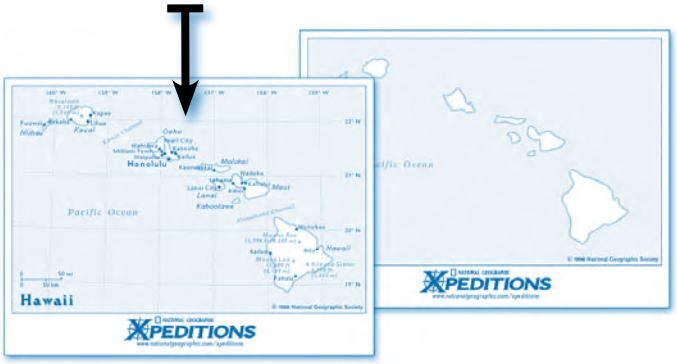
Teaching Scenario: Secondary *continued*

www.nationalgeographic.com/xpeditions

5 Ms. Walker knows that Xpeditions has hundreds of print-friendly maps, so she goes to the Xpeditions homepage and clicks **Atlas**. She easily finds maps of Japan and Hawaii. By selecting **Basic** she removes all labels on the map of Hawaii. She prints copies of this map for her students and has them diagram key locations of the attack using the information they have studied. She asks the students to label the direction in which the carriers and planes moved, and to add notes highlighting key events. Then she has them consider why Hawaii was such a strategic location in this conflict and what the attack patterns on the map illuminate about the surprise strike.



6 Ms. Walker uses a variety of strategies to check for understanding throughout this multi-day lesson. She also customizes a formal assessment for the end of the lesson that provides students with an engaging way to demonstrate what they have learned. She has students create projects examining lessons that the events at Pearl Harbor can teach about conflict preparation and prevention of violent outcomes to it. Her students include an analysis of the role geography played both in the origins of the conflict and in Japan's ability to conduct such a surprising and devastating attack. They also make connections to their lives by examining the relevance of Pearl Harbor's lessons to more recent events.

> **"For all teachers who strive to work smarter, not harder, these teacher developed and teacher-tested standards-based lessons contain all of the components of sound educational pedagogy—CIA: Curriculum, Instruction and Assessment."**
>
> — Dr. Susan A. Lancaster
> Bellarmine University Professor: Kentucky

7 **Suggestions for follow-up activities:**

- Many parallels have been drawn between the Pearl Harbor and the 9/11 terrorist attacks. Engage students in an in-depth comparison between these two strikes. One angle to consider is an analysis of the US level of preparedness in each attack. Should or could the attacks have been better anticipated? Could more have been done to prevent them?
- Have students conduct oral history interviews with older members of their families or community who have personal remembrances of the attack. What are their perspectives on Pearl Harbor? How did they feel about the President's and the Government's reactions? What impact did it have on life as they knew it, on the war, on the world? Students can also access National Geographic's **online Talk Board** provided in the **Legacy of Pearl Harbor** lesson to find someone to interview. (These are two of the lessons found in step 1.)
- Have students visit the National Geographic magazine feature **Oil and Honor at Pearl Harbor** (linked from the home page of National Geographic's Pearl Harbor site) and read about the Navy's effort to recover victims' bodies from the U.S.S. Arizona. Then, have students click on **Poll** and read the question regarding the oil still leaking from the ship. Divide students into teams and have them research the issue, and develop and present debate arguments taking a position on what should be done with the memorial.

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Teaching Scenario: Elementary

www.nationalgeographic.com/xpeditions

Setting the Stage

Fourth grade teacher Mr. Allen is about to start a unit on plate tectonics. He knows his students will be interested in the topic because their school has been involved in several relief projects helping victims of natural disasters that have occurred over the past several years, including the December 2004 Indian Ocean tsunami. Still, teaching the concept of plate tectonics and the way physical processes shape the Earth is complex and somewhat abstract. He knows that to make it more engaging for his students he will need to complement his classroom materials with multimedia resources and real-life stories available on the Internet. Mr. Allen has several students in his class who are very interested in developing multimedia presentations as well as two special needs students who benefit greatly from tactile activities.

1 Mr. Allen starts his planning by visiting the Thinkfinity site and clicking on the **Xpeditions** logo. He begins his search for materials by clicking **Search Xpeditions** and entering "plate tectonics" as a search term. He receives many results from which to choose.

2 He begins his unit by asking how many students remember the tsunami disaster of 2004. He uses maps from the **Xpeditions Atlas** to have students locate the area of the undersea earthquake (off the coast of Sumatra) and the areas hardest hit by the tsunami (Indonesia, Thailand, Sri Lanka). Mr. Allen leads a discussion in which he asks students to speculate as to how an earthquake under the ocean, so far away, could send waves with such force to the affected land masses in such a dramatic way.

3 Mr. Allen finds more resources by searching Xpeditions for "tsunamis." He has his students work in pairs to read one of them—the National Geographic News article **Tsunamis: Facts About Killer Waves**—to learn more about the formation and effects of tsunamis. In order to help students see the global impact of such occurrences, he has students use their **Atlas** maps to locate the earthquakes and resultant tsunamis mentioned in the article. He challenges students to learn more about these events.

4 After engaging students in the topic, Mr. Allen uses the Xpeditions lesson **Earthquakes and Volcanoes** (a match from his initial search) to introduce students to plate tectonics and the way the movement of the Earth's plates can cause monumental natural disasters such as a tsunami. In the lesson, students identify areas in the United States that are at risk for earthquakes and explore the National Geographic interactive feature **Forces of Nature**. Using the "Lab" sections for earthquakes, students identify the various types of fault lines associated with plate tectonics to understand how earthquakes happen.

5 Mr. Allen has students spend several class periods working through the interactive Lab and Case Studies sections of **Forces of Nature**. In the case studies, students learn about several historical occurrences of two types of seismic events. Mr. Allen arranges students in small groups to create original case studies focused on the December 2004 earthquake and tsunami or another event of their choosing. Students use multimedia software such as Microsoft PowerPoint or Microsoft Hyperstudio to create their presentations.

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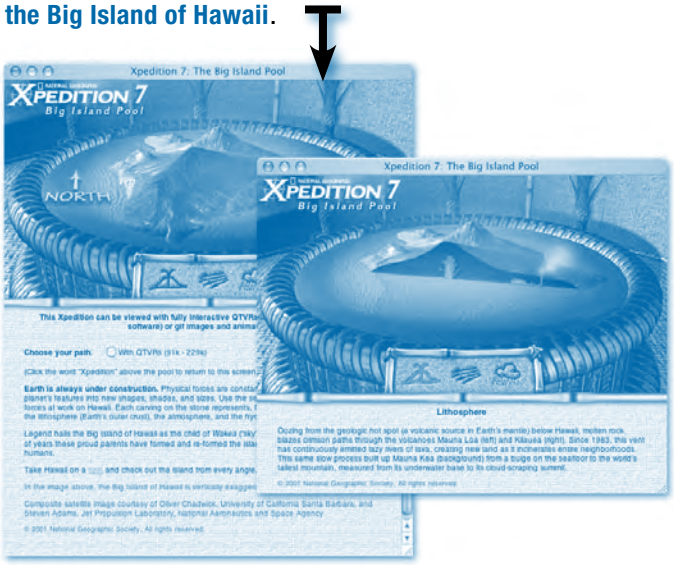
Teaching Scenario: Elementary *continued*

www.nationalgeographic.com/xpeditions

6 After having students share their presentations, Mr. Allen uses the Xpeditions lesson **How are Islands Formed?** and the interactive National Geographic resource **Volcano! Mountain of Fire** (linked from the lesson) to help students learn more about the relationship between plate tectonics and the development and eruption of volcanoes. In **Volcano!** he finds the video clip particularly useful for helping students understand the relationship between plate tectonics and volcano formation.

> **"With lessons written to Standards I can be confident that my students are on track with focused, fun, and engaging activities."**
>
> — Nell Strong
> Middle School Teacher: Indianapolis, Indiana

7 Wanting to add a hands-on, tactile component to his students' study, Mr. Allen incorporates the use of modeling clay. First, he has students revisit the **Volcanoes Lab** in **Forces of Nature** to identify the various types of volcanoes caused by plate tectonics. Then, using the **Xpedition Hall** exhibit **Big Island Pool**, Mr. Allen has students study the topography of the Big Island of Hawaii and use the modeling clay to create a model of this island. Mr. Allen provides students with additional images of Hawaii's topography by using the **Thinkfinity Search Engine**, where he finds a collection of images in **Volcano World's Virtual Field Trip to the Big Island of Hawaii**.



8 Mr. Allen's students have spent a good deal of time learning about plate tectonics and how the Earth and its population have been affected by this movement. In order to assess their understanding, he again divides them into groups and asks them to prepare oral presentations on the physical processes of plate tectonics. He allows students to choose any medium they would like to supplement their oral reports, but instructs them to include the traditional "who, what, when, where, why, and how" of factual reporting. Mr. Allen encourages students to use the Xpeditions resources they have studied in class and to search for more information using the Thinkfinity Search Engine. He creates a rubric for assessing student reports and makes sure that each student has a role in the group work.

9 **Suggestions for follow-up activities:**

- Visit the National Geographic **EdNet Forces of Nature Educator Community** to learn more about resources available for teaching these concepts. Consider using the online forums to discuss your instructional strategies and get new ideas for engaging students.
- Delve into related areas of study by visiting the **Xpeditions Search Engine** to find grade-appropriate lessons about national emergencies related to natural disasters, disease epidemics and environmental concerns.

> **"The lesson plans are rich in content and the interactive features bring adventure to my classroom with economy and ease. The various grade levels available in the lessons allow me to differentiate instruction to meet the needs of my students."**
>
> — Jim Young
> Middle School Social Studies Teacher: New Hampshire

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EDSITEment Mission Statement

EDSITEment is sponsored by the National Endowment for the Humanities (NEH), and covers the subject areas of history and social studies, literature and language arts, foreign languages, and art and culture. All materials housed on EDSITEment have been rigorously reviewed by humanities scholars, classroom teachers and education administrators for content, design and educational impact in the classroom. EDSITEment is designed to enhance teachers' knowledge and to provide engaging activities for students by integrating the highest quality online humanities resources available into classroom teaching.

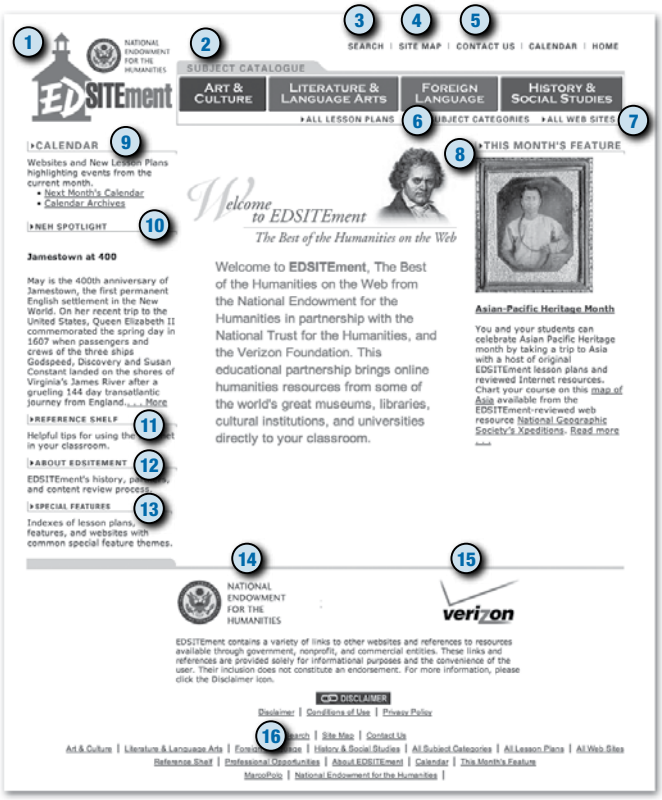
Using EDSITEment

From the Thinkfinity homepage, click on the Partner site logo, or type **edsitement.neh.gov** in the address line of your Web browser, and click Enter or press Return.

The EDSITEment homepage appears.

The following numbered list corresponds to the screenshot on the right showing the features of the homepage.

1. Visit **EDSITEment** for rich humanities resources.
2. Visit the **Subject Catalogue** to browse lesson plans and Web sites by subject.
3. **Search** EDSITEment and all of the Thinkfinity Partner sites.
4. Go to the **Site Map** for navigation assistance.
5. **Contact Us** to offer feedback.
6. Browse all **lessons** by grade, title and subject at **All Lesson Plans**, or perform a **Quick Search** of EDSITEment lessons.
7. Discover the very best humanities Web sites, all reviewed by peer review panels, at **All Web Sites**.
8. Check out the latest topic featured by EDSITEment in **This Month's Feature**.
9. Explore the **Calendar** for timely lesson plans and reviewed Web resources and activities.
10. Learn about NEH-supported events and programs for educators in **NEH Spotlight**.
11. Visit the **Reference Shelf** for tips on better browsing, evaluating Web sites and citing Web resources.
12. Read more **About EDSITEment**.
13. Find EDSITEment resources with **Special Features** themes.
14. Access the **NEH** site.



15. Access the **Verizon Foundation** Web site.
16. Discover **Professional Opportunities** at NEH, including NEH grants.

NEH Mission Statement:

The **National Endowment for the Humanities** (NEH) is an independent federal agency created in 1965, and is the largest funder of humanities programs in the United States. NEH serves and strengthens our Republic by promoting excellence in the humanities and conveying the lessons of history to all Americans. The Endowment accomplishes this mission by providing grants for high-quality humanities projects in four funding areas: preserving and providing access to cultural resources, education, research, and public programs.

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EDSITEment: Features

edsitement.neh.gov

Inside the EDSITEment Web Site

Common Features

Lessons

Click **All Lesson Plans** on the EDSITEment homepage to find online humanities lessons organized by title, grade band and subject category. All lessons feature reviewed Web site links and extensions.

Standards

Because EDSITEment lessons cover more than one subject area, they are aligned with multiple national humanities standards. Each of these multidisciplinary lesson plans focuses on a guiding question and addresses specific learning objectives and skills. See the bottom of each lesson under **Standards Alignment** for a description of the standards covered by that lesson.

The Thinking Behind Our Lessons

EDSITEment lesson plans provide teachers with accurate, scholarly background information to supplement the textbook and their own knowledge on commonly taught and less-familiar curricular topics. EDSITEment lesson plans guide teachers in the most effective classroom use of exemplary peer-reviewed humanities resources by offering student-centered classroom activities focusing on primary sources, such as digitized texts and maps from major libraries and scholarly archives, and photograph images from online museum collections. An overarching Guiding Question focuses on the most significant concept or issue addressed in each lesson; Learning Objectives specify the knowledge students should gain from completing the lesson activities.

Student Materials

All EDSITEment lessons feature student activities integrated directly into the lesson plan itself. Check the left sidebar under **Additional Student / Teacher Resources** for the variety offered. Finally, be sure to check out the Calendar and This Month's Feature for timely resources and activities to use in the classroom.

Web Links

EDSITEment features an extensive directory of reviewed humanities Web sites found at **All Web Sites**. All sites have undergone a rigorous peer-review process by panels composed of higher education humanities scholars, classroom teachers and school administrators to ensure they meet EDSITEment's strict criteria for classroom use. The sites are organized by subject areas: Art & Culture, Literature & Language Arts, Foreign Language, and History & Social Studies.

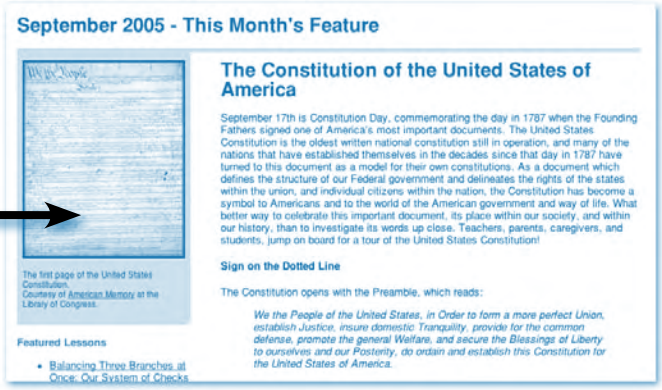
Unique Features

Calendar

Each month EDSITEment highlights lesson plans and reviewed Web sites relating to commemorative events.

This Month's Feature

Teachers, caregivers, and parents can find abundant material here focusing on each month's special topic, such as Black History Month or Women's History Month.



Reference Shelf

Through its Reference Shelf, EDSITEment provides tips for researching, analyzing and integrating online primary documents in classroom teaching.

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Teaching Scenario: Elementary

Cultural History in an Ethnically Diverse School

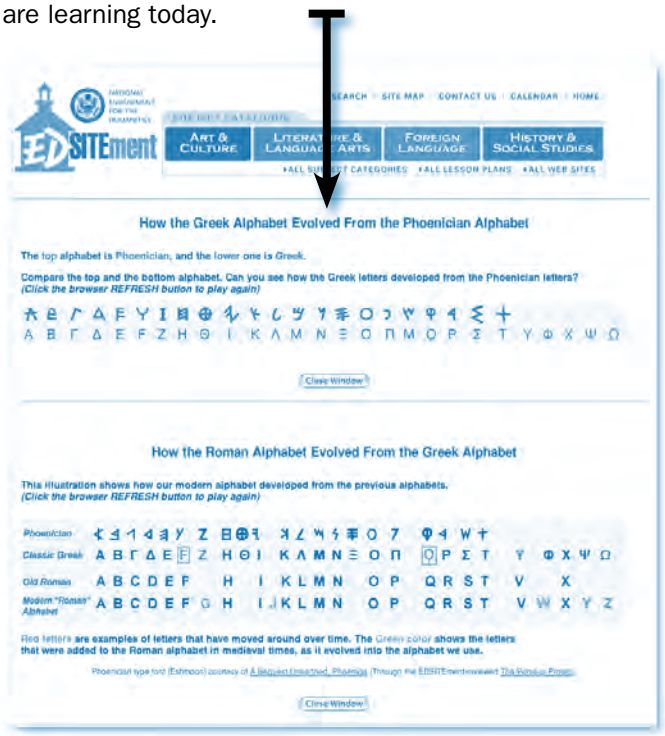
edsitement.neh.gov

Setting the Stage

A large, urban elementary school in California was charged by its school board to address two challenging issues faced by many schools across the US: improving literacy in the primary grades and adapting curriculum to meet the needs of an increasingly culturally diverse student body. Several teachers on the curriculum committee have attended Thinkfinity training sessions and think that the rich variety of online curriculum materials and the diverse teaching approaches using online multimedia resources will provide an excellent pilot program for meeting their classroom challenges.

1 As she is challenged with teaching reading to many students for whom English is not their first language, Ms. Gonzales, the second grade teacher, decides to try a more holistic approach to teaching language arts. Choosing **EDSITEment** from the **Thinkfinity home page**, Ms. Gonzales selects the category **Literature and Language Art** under the subject catalogue and sees a lesson she thinks will interest her students: **The Alphabet is Historic**, *http://edsitement.neh.gov/view_lesson_plan.asp?id=517.*

Her students are fascinated with the animated alphabet (in the **Additional student / teacher Resources** section of the lesson plan) showing how Phoenician characters evolved into Greek and then Roman letters to the alphabet they are learning today.



2 Meanwhile, in the same school, the art teacher, Mr. Dunlap, is committed to integrating the arts in to all areas of the curriculum and is delighted to find an EDSITEment lesson (in the **Art & Culture** section) covering the ways prehistoric humans communicated, **Cave Art: Discovering Prehistoric Man Through Pictures**. *[http://edsitement.neh.gov/view_lesson_plan.asp?id=362]* Because the premise of the lesson is understanding how people communicate without a written language, he finds the incredible images and visual emphasis in this lesson ideal for showing common ways of expression among young students speaking different languages.

Mr. Dunlap's students are captivated by the Cave of Lascaux Web site which simulates the discovery of the cave paintings: as students move their mouse over the black home page, it resembles a flashlight beam picking up the amazing images of animals painted thousands of years ago as a means of communicating important information.

> **"Excellent, engaging lessons, an impressive array of humanities-related materials, a well-conceived reference shelf, and a special section devoted to professional opportunities make this site a top candidate for every teacher's list of favorite links."**
>
> — James Bucky Carter
> Ph.D Candidate: University of Virginia

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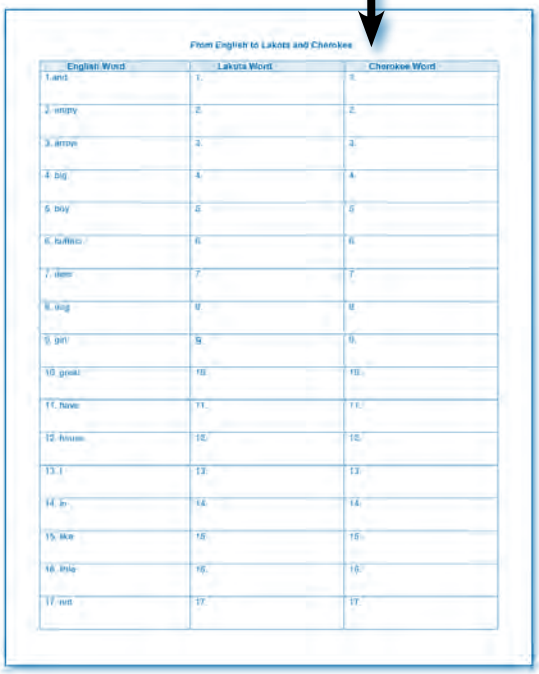
Teaching Scenario: Elementary (Cultural History in an Ethnically Diverse School) *continued*

edsitement.neh.gov

3 This elementary school is fortunate to have a Native American, Mr. Arrowsmith, to conduct the fourth grade Gifted and Talented class. Because he has a personal interest in preserving native and endangered languages and is on a national committee for this effort, Mr. Arrowsmith wants to introduce his students to the richness and diversity of several Native American tribes. Mr. Arrowsmith selects **US History: Native American** from the drop-down **Subject Navigator** menu, within the History & Social Studies section, where he determines that **Traditions and Languages of Three Native Cultures** is ideal for his approach to teaching. Although written to provide background information on teaching native culture for K-2 students, he adapts the lesson for older, reading learners, who can do the word translation exercises on their own.


From English to Lakota and Cherokee

English Word	Lakota Word	Cherokee Word
1. ant	1.	1.
2. empty	2.	2.
3. arrow	3.	3.
4. big	4.	4.
5. boy	5.	5.
6. buffalo	6.	6.
7. deer	7.	7.
8. dog	8.	8.
9. girl	9.	9.
10. goat	10.	10.
11. have	11.	11.
12. house	12.	12.
13. I	13.	13.
14. in	14.	14.
15. like	15.	15.
16. little	16.	16.
17. not	17.	17.

> **"We are studying the origins of language —absolutely awesome—I found the Egyptian alphabet that you link to an incredible student tool. I would like to extend the lesson and have the students use their imagination and come up with their own papyrus."**
>
> — F. Westerman
> 5th grade Gifted and Talented Teacher

4 Ms. Frank's third grade class is also learning about different cultures and early forms of communication. In the subject catalogue under **Art & Culture**, she finds the EDSITEment lesson **Egyptian Symbols and Figures: Hieroglyphs** and determines it is a perfect fit for her unit on Egypt. She begins by telling her students to pretend that they have no form of writing and asks them how they can send a message to someone. After someone suggests that this can be done with pictures, she asks students what sort of pictures they would draw that would be familiar to both the message sender and the receiver. She asks the students to think about their natural environment, and encourages them to think of trees, grass, stones, animals, flowers and anything that is typical of their environment. She also suggests that they include human body parts, like hands, feet, eyes and ears. Ms. Frank lists on the board objects suggested that could be used to send a "picture message."

Ms. Frank then tells her students about Egyptian hieroglyphs and ideograms, referring to the information on the EDSITEment-reviewed Web sites **Nova: Pyramids** and **Metropolitan Museum of Art** used in this lesson. She then shows them the Egyptian alphabet from **Nova**, and ideograms from the **Metropolitan**, pointing out that the Egyptian system was the same as the one they've just invented themselves.

She mentions that although there are thousands of symbols, the most commonly occurring are a set of 24, which modern archaeologists use as a working alphabet.

Now that they have their alphabet, students work together to figure out how to write the sentence "The silly rabbit lost its carrot and had to go to sleep hungry." Using the symbols, they write their hieroglyphs on the board.

Ms. Frank then shows students an actual sentence in Egyptian hieroglyphs taken from a papyrus scroll. She scans across from right to left, slowly reading the translation aloud. She reminds them to read toward the faces of the animal symbols, and notes that this is an English translation of an ancient Egyptian message, since the language might appear a bit stilted.

Now that the students have an idea of how hieroglyphs were used, the teacher tells them to imagine they are Egyptian scribes. While viewing projections or handouts of the Egyptian alphabet and ideograms, each child writes his or her name in hieroglyphs, followed by an ideogram of his or her choice, finishing with a cartouche around their name. When the project is done, the students try to read each other's hieroglyphs.

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Teaching Scenario: Secondary

Team Teaching the Civil War in High School English and History

edsitement.neh.gov

Setting the Stage

Ms. Smith, 10th grade American literature teacher and Mr. Burgess, 10th grade US history teacher, are coordinating a unit on the Civil War as it is treated in history and in literature. They want their students to experience the event more fully and are looking for ways to engage their students in more personal aspects of the war's impact.

1 Ms. Smith, the English teacher, has heard that Thinkfinity offers materials for most of the curriculum and that its resources are free. She goes to the humanities partner Web site, EDSITEment, and selects **Advanced Search** to limit her search to EDSITEment and to language arts and social studies, typing in "Civil War literature." Among the lesson plans listed in the results, she selects one of two companion lessons on Stephen Crane's novel ***"The Red Badge of Courage:* A New Kind of Realism,"** *http://edsitement.neh.gov/view_lesson_plan.asp?id=444*. Both she and Mr. Burgess agree that this lesson is a perfect match for their unit. It links to an e-text version of the novel, and it uses primary documents, such as sketches, photographs, soldiers' descriptions in letters home and journal accounts.

2 On the first day, Ms. Smith introduces the unit to her English students, sharing online reviews of the novel to emphasize Crane's new style of writing and how his approach to realism was received by critics. She asks students to consider how stylistic elements in the novel may have contributed to the striking impression it made.

> **"I used this [lesson] as part of a unit on the Red Badge of Courage that emphasized examining the mind of Henry Fleming. My unit also incorporated critical reasoning and that is where I used this material."**
>
> — Ms. Smith
> High School English Teacher

3 On the same day, Mr. Burgess, the history teacher, introduces students to the war through contemporary battlefield sketches by Winslow Homer and photographs of the wounded and dead by Matthew Brady. He asks students to compare the paintings and photos of Civil War subjects by considering which of the following adjectives (and any they would add) apply to each image: anonymous, biased, courageous, famous, heroic, realistic, romanticized, static, unbiased, vivid.

4 In a joint session, both teachers ask the students to discuss: Which painting is closer in tone to *The Red Badge of Courage*? In what way?

The teachers then ask students to compare each of the photographs to a specific accompanying passage from *The Red Badge of Courage* and describe how this imagery relates to the realism of the novel.

5 In her American lit class the next day, Ms. Smith breaks the class up into small groups of four to six students and assigns each a Winslow Homer sketch (all available via links from peer reviewed Web Sites embedded in the EDSITEment lesson plan).

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6 *The Red Badge of Courage* and First-Hand Accounts

Both teachers use primary documents whenever possible in their teaching to make the topic more immediate and personal for their students. In the next day's activity, students compare and contrast some specific elements of style in *The Red Badge of Courage* to first-hand accounts of the Civil War. This activity can be done in a whole-class setting, or each comparison can be assigned to one of five groups for analysis and eventual presentation to the class.

> **"The lesson was excellent. I use a variety of primary sources with my lessons, and this was well received by the students."**
>
> — Ms. Smith
> High School English Teacher

> **"What is really interesting about the materials the lesson writer has gathered here is that they provide concrete examples of how Crane developed a form of literary realism in response to new styles of reportage—of documentary photography and eyewitness first-person accounts—that emerged during and after the Civil War."**
>
> — Mr. Burgess
> High School US History Teacher

7 To help her students appreciate the novelty of Crane's method, Ms. Smith asks them to compare it with a poem that takes a more traditional approach: "The Attack and the Repulse" by Edward C. Judson, *Poetical Pen-Pictures of the War Selected from Our Union Poets*, available through **The Nineteenth Century in Print Periodicals** collection of the EDSITEment-reviewed Web site, **American Memory**. "The Attack and the Repulse" describes an assault that took place during the Battle of Cheat Mountain (Va.) on September 12, 1861. The collection of poems was published the next year, while the war was still being vigorously fought.

8 In his history class, Mr. Burgess has his students locate a brief passage from *The Red Badge of Courage* that describes the course of an assault. They contrast it with an excerpt from "Chancellorsville," a first-hand account of the battle from the Confederate point of view, from **Chapter VIII of Reminiscences of the Civil War** by John B.Gordon, available on **Shotgun's Home of the American Civil War**, a link from the EDSITEment-reviewed Web site, **Center for the Liberal Arts**.

He then asks his students: What is the purpose of Gordon's account? Crane's?

AMERICAN MEMORY PREVIOUS NEXT NEW SEARCH

Selected Civil War Photographs, 1861-1865

Click on picture for larger image, full item, or more versions. [Rights and Reproductions]

[Fredericksburg, Va. Wounded from the Battle of the Wilderness].

Gardner, James, b. 1832, photographer.

CREATED/PUBLISHED
1864 May.

SUMMARY
Photograph from the main eastern theater of war, Grant's Wilderness Campaign, May-June 1864.

NOTES
Reference: Civil War photographs, 1861-1865 / compiled by Hirst D. Milhollen and Donald H. Mugridge, Washington, D.C. : Library of Congress, 1977. No. 0290

Title from Milhollen and Mugridge.

Two plates form left (LC-B811-2507B) and right (LC-B811-2507A) halves of a stereograph pair.

Forms part of Selected Civil War photographs, 1861-1865 (Library of Congress)

Assessment Suggestions

As a joint assessment, Ms. Smith and Mr. Burgess assign students to create a first-person account using the basic stylistic characteristics of *The Red Badge of Courage*. Students start with a series of five or more images from a specific event: original sketches, family photographs, historical images or images from magazines and newspapers. Students then create their own illustrated, impressionistic account of a particular event, sharing their work through a display of images and writing, posted on a real or virtual bulletin board, or in an oral presentation framed as a television documentary.

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Illuminations provides standards-based resources and materials that illuminate the vision of NCTM for school mathematics and improve the teaching and learning of mathematics for all students. Lessons and activities on the Illuminations site have been developed in alignment with NCTM's *Principles and Standards for School Mathematics*.

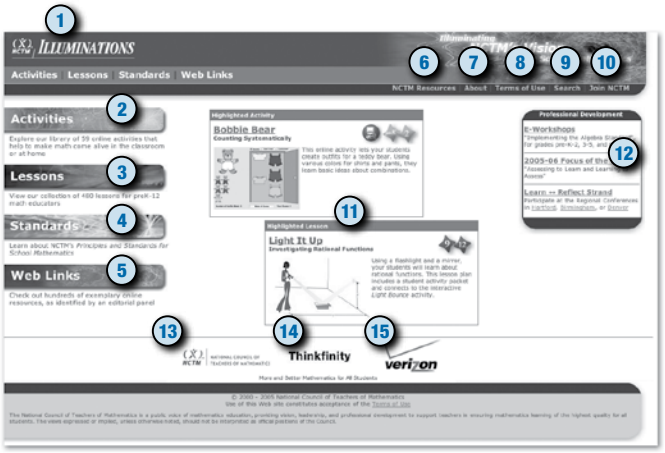
Using Illuminations

From the Thinkfinity homepage, click on the Partner site logo, or type **illuminations.nctm.org** in the address line of your Web browser, and click Enter or press Return.

The Illuminations homepage appears.

The following numbered list corresponds to the screenshot on the right showing the features of the homepage.

1. Visit **Illuminations** to find mathematics resources designed to improve teaching and learning.
2. Watch mathematics come alive in the **Activities** section, which contains interactive online activities for both teachers and students.
3. Search the **Lessons** section to find single-day lessons or multi-day units in mathematics for grades pre-K–12.
4. Learn about NCTM's *Principles and Standards for School Mathematics* in the **Standards** section.
5. Visit the **Web Links** section to find the best online destinations for teaching and learning mathematics.
6. Browse NCTM's catalog of math-related **NCTM Resources**.
7. **About** provides background information on Illuminations and NCTM.
8. Teachers can use Illuminations materials freely in their classrooms, but all other uses are governed by NCTM's **Terms of Use**.
9. **Search** Illuminations and all of the Thinkfinity Partner sites.
10. **Join NCTM** to become part of a dynamic group of over 100,000 math education professionals.



11. Updated regularly, the **Highlighted Activity** and **Highlighted Lesson** showcase some of Illuminations most popular resources.
12. Learn more about NCTMs **Professional Development** opportunities.
13. Visit **nctm.org**, the official Web site of the **National Council of Teachers of Mathematics**.
14. Access the **Thinkfinity** Web Site.
15. Access the **Verizon Foundation** Web site.

NCTM Mission Statement

The **National Council of Teachers of Mathematics** is a public voice of mathematics education, providing vision, leadership and professional development to support teachers in ensuring mathematics learning of the highest quality for all students.

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Illuminations: Features

illuminations.nctm.org

Inside the Illuminations Web Site

The Thinking Behind Our Lessons

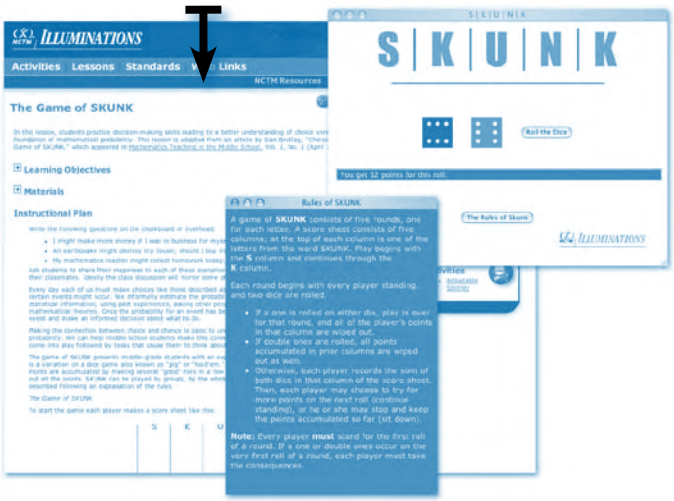
Illuminations lessons are created by classroom teachers who have great ideas to share. They are written for classroom teachers, in alignment with the *Principles and Standards for School Mathematics*, to ensure more and better mathematics for all students.

Common Features

Lessons

The goal of Illuminations is to provide materials and resources that illuminate the vision for school mathematics as described in NCTM's *Principles and Standards for School Mathematics*. The site provides more than 500 standards-based lessons that improve the teaching and learning of mathematics for all students.

Lessons on the site can be searched by math standard and grade band. Each lesson suggests classroom activities and pedagogical strategies. Within each lesson are student activity sheets and links to more than 60 online activities in the **Activities** section.

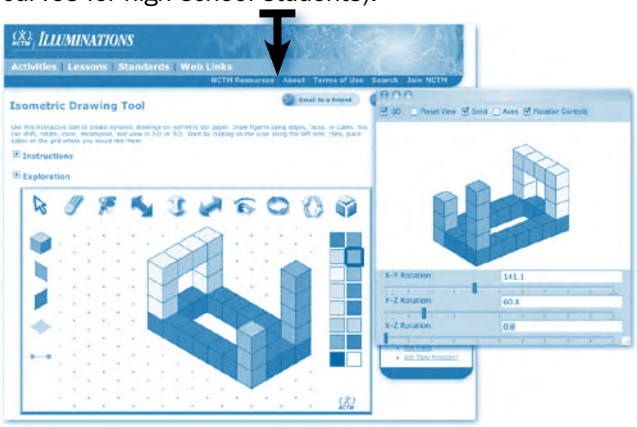


Selected Web Links

When you enter the **Web Links** section, you'll have access to thousands of Web sites that have been reviewed and approved by an expert editorial panel. Organized by content area, these links include resources for both teachers and students.

Activities

There are more than 60 online activities on the Illuminations Web site. Students and teachers can explore the applications of math from fractals to fractions using such activities as **Bobbie Bear** (counting strategies for young students), the **Factor and Product Games** (factors and multiples for middle grades) and **Robot Sketcher** (cardioids and other geometric curves for high school students).



Standards

Links to the *Principles and Standards* can be accessed from the **Standards** section. The description of the five content standards, the five process standards and the six principles provide a thorough background of the NCTM vision for school mathematics.

- **Five content standards:** Number and Operations, Algebra, Geometry, Measurement, and Data Analysis and Probability
- **Five process standards:** Problem Solving, Reasoning and Proof, Communication, Connections, Representation
- **Six principles:** Equity, Curriculum, Teaching, Learning, Assessment, Technology

Unique Feature

Explorations

The **Explorations**, contained within the Activity pages, allow students to explore the activities on their own, in class or at home. A series of questions or a link to an activity sheet provides the structure for an investigation that can be completed using an applet or other online activity.

Teaching Scenario: Elementary

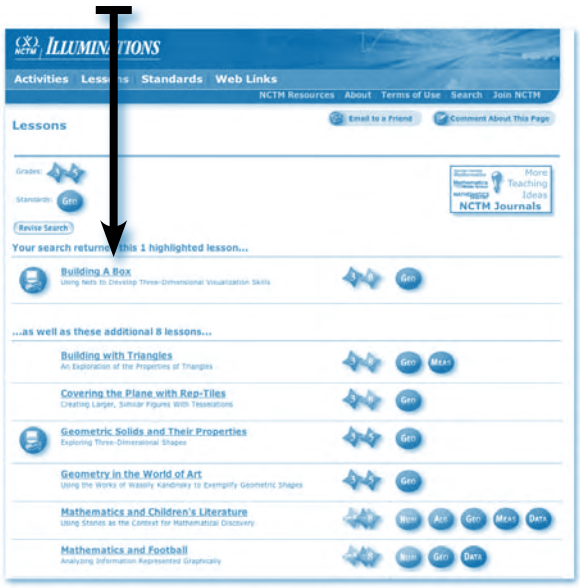
illuminations.nctm.org

Setting the Stage

Ms. Martinez is about to begin a geometry unit with her class of fourth graders in San Diego. In the past, she has noticed that her students had difficulty with spatial visualization, the ability to predict what things will look like in three dimensions. Her school uses textbooks and workbooks that contain good illustrations, but based on her experience and a review of educational literature, she believes that students will develop stronger spatial visualization skills if they use hands-on, interactive activities. In addition, *Principles and Standards for School Mathematics* suggests that spatial visualization and reasoning are core skills that all students must develop, and the California State Content Standards for Grade 4 note that students should be able to "visualize, describe, and make models of geometric solids (e.g., prisms, pyramids) in terms of the number and shape of faces, edges, and vertices; interpret two-dimensional representations of three-dimensional objects; and draw patterns (of faces) for a solid that, when cut and folded, will make a model of the solid." The full text of the California Standards are available at *http://www.cde.ca.gov.*

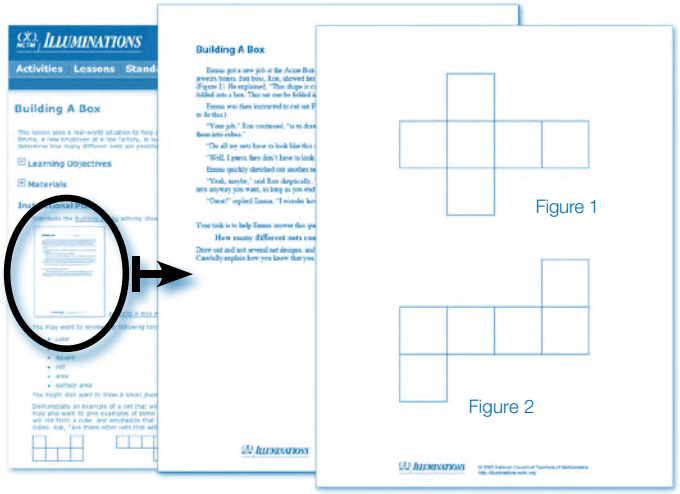
Ms. Martinez's classroom has 10 computers with Internet access. There are 30 students in her class. This allows her to divide the students into groups of three for computer work.

1 From the Illuminations home page, Ms. Martinez chooses **Lessons** from the main toolbar and then she searches for **Geometry lessons** in **Grades 3-5**. Although she gets many results, she decides to investigate the highlighted **Building a Box** lesson, because the description indicates that it will develop students' spatial visualization skills.



2 When Ms. Martinez looks over the lesson, she especially likes that students are asked to construct boxes. She believes that this hands-on approach will go a long way in helping her students see what happens when a 2-D figure is transformed to a 3-D object.

3 She also likes the story on the **Building A Box activity sheet** that accompanies the lesson (see the story's text below):



Emma got a new job at the Acme Box Factory. Her job is to construct cubes that will be used as jewelry boxes. Her boss, Ron, showed her the company's current blueprint for making these boxes (Figure 1). He explained, "This shape is called a net. A *net* is a flat figure that can be cut out and folded into a box. This net can be folded into a cube that measures 3 centimeters on each side."

Emma was then instructed to cut out Figure 1 and fold it into a cubical box. *(You may also want to do this.)*

"Your job," Ron continued, "is to draw as many of these nets as you can, cut them out, and fold them into cubes."

"Do all my nets have to look like this one?" asked Emma.

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Teaching Scenario: Elementary *continued*

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"Well, I guess they don't have to look like that… but how else could they look?" inquired Ron.

Emma quickly sketched out another net (Figure 2) and exclaimed, "Wouldn't this also work?"

"Yeah, maybe," said Ron skeptically. "It doesn't matter to me how you do it. You can make the nets anyway you want, as long as you end up with cubes measuring 3 centimeters on each edge."

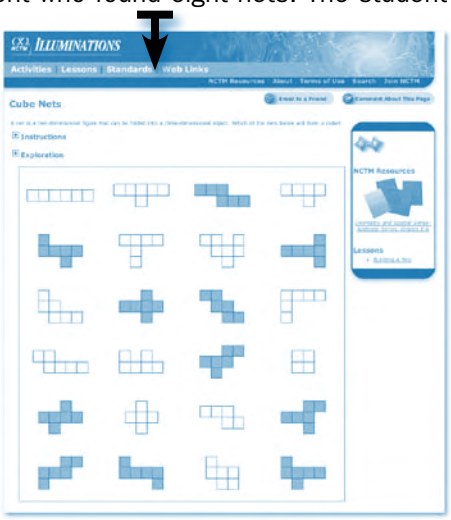
"Great!" replied Emma. "I wonder how many ways there are to make such a net?"

Your task is to help Emma answer this question:

How many different nets can you draw that can be folded into a cube?

Ms. Martinez decides to teach this lesson, but instead of giving students the activity sheet, she copies it onto a transparency and displays the story on the overhead projector. She draws a grid of 3 cm × 3 cm squares on a sheet of blank paper, copies it, and distributes several sheets to each student. Students can then use these sheets to test various nets.

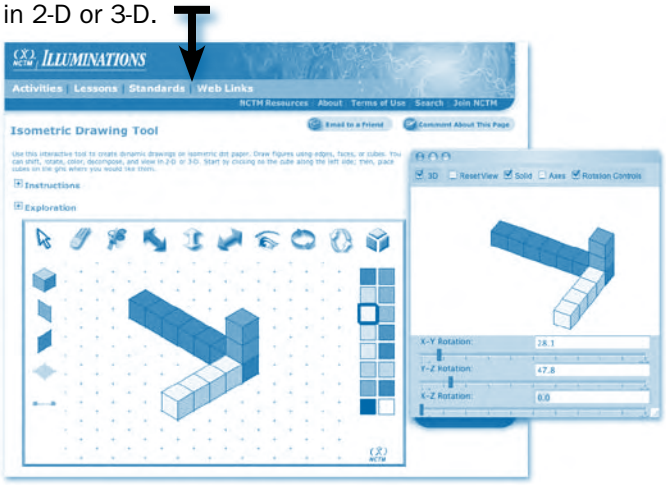
4 As it turns out, there are 11 unique nets that will form a cube when folded. Students in Ms. Martinez's class have varying levels of success in finding them. Some students were able to find only five or six, and one student found nine different nets, but no one found all 11. Ms. Martinez divides students into groups of three and has them compare their results. One student who found only five nets is grouped with another student who found eight nets. The student with only five found two nets not discovered by the other student, so combined they had found 10! Still, none of the groups were able to find all 11.



> **"I believe that math teachers struggle the most when finding ways to integrate technology [in the classroom] with their students. [Illuminations] has an answer for all math topics and levels and integrates technology in many of the lessons. The Activities section is outstanding!"**
>
> — Julie Turner
> District Instructional Technologist: Boerne, Texas

Ms. Martinez allows students to self-assess their work with the **Cube Nets** activity, which she finds through a link at the bottom of the **Building A Box** lesson plan. Again working in groups of three, students use this tool to discover all 11 nets. In particular, they are to identify those nets that they hadn't discovered during the lesson.

5 The students really enjoy using the **Cube Nets** activity, so Ms. Martinez looks into using other NCTM resources by browsing through the interactive applets available from the **Activities** section of Illuminations. This led her to the **Isometric Drawing Tool**, which allows students to create 3-D figures using cubes. Students can shift, rotate, color and decompose figures and they can view any of the figures in 2-D or 3-D.



The six lessons from the **Using Cubes and Isometric Drawings** unit provided Ms. Martinez with a lot of good ideas. In particular, she liked the ideas in the lesson, **Building Using the Front-Right-Top View** located within the **Lessons** section. Using these views to create a 3-D shape—or, conversely, drawing the front, right, and top views of a 3-D object—falls exactly in line with her state requirement that students be able to interpret two-dimensional representations of three-dimensional figures.

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Teaching Scenario: Secondary

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Setting the Stage

Ms. Naylor is a middle grades teacher in Pennsylvania. On the first day of school, she asks students to determine the value of the following expression:

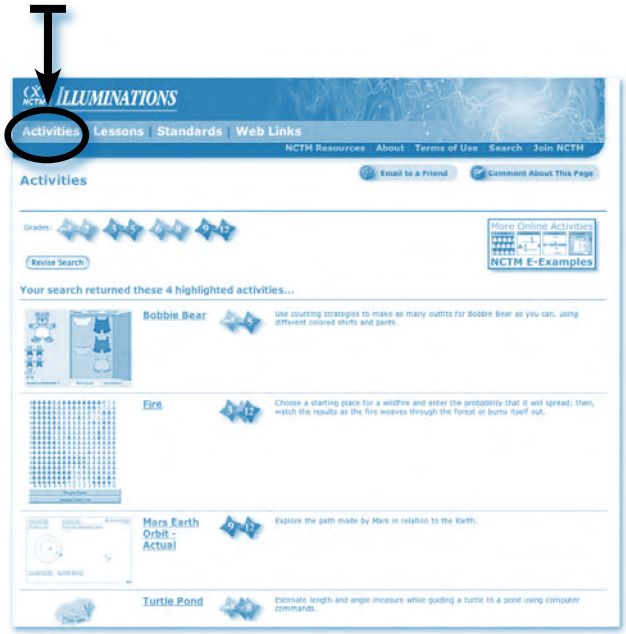
$$5 + 10 \times 2$$

Students excitedly call out the answer, "30!" But then Ms. Naylor asks them to enter the expression into their scientific calculators, and another answer is returned: 25. Confused by the results, students are interested to learn why the answers are different. This leads to a discussion of the order of operations.

Ms. Naylor knows that understanding the order of operations is important for students, because it will lead to their later success in algebra. Moreover, she knows that Pennsylvania students will be tested on their ability to "simplify numerical expressions involving exponents, scientific notation and using order of operations." From her many years in the classroom, however, she knows that students are often reluctant to write out all the steps when determining the value of a complex expression. She turns to Illuminations to find a way to convince students that writing out each step is necessary. The full text of the Pennsylvania Standards is available at *http://www.pde.state.pa.us.*

Ms. Naylor has a computer connected to a TV in her classroom, and she is able to project what she sees on the computer screen to the entire class. With advanced planning, she can also schedule time for her students in one of the school's two computer labs.

1 Ms. Naylor first learned about applets when she was introduced to the E- Examples on NCTM's Standards Web site, *http://standards.nctm.org,* a few years ago. Since then, she has become a regular visitor to Illuminations, because it contains over 60 applets in its **Activities** section, each of which can be used to demonstrate various mathematical concepts.

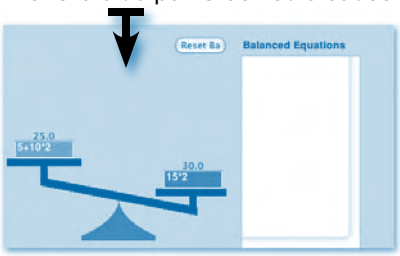


2 In looking over the list of Activities, she found the **Pan Balance – Numbers** activity, which allows an expression to be entered into each side of a pan balance. If the expressions are equivalent, the pans will balance. Using this tool, she entered $5 + 10 \times 2$ into the red pan and the number 25 into the right pan, and the pans balanced. She then replaced the 25 with the expression $5 + 20$, and again the pans balanced. In the Balanced Equations area, she saw the following:

$$5 + 10 \times 2 = 25$$
$$5 + 20 = 25$$

She then realized that, by using this applet with her students, she could teach them the order of operations and encourage them to write out each step when simplifying complex expressions.

3 In class, she projected the **Pan Balance – Numbers** applet onto the overhead screen. She placed the expression $5 + 10 \times 2$ in the red pan and asked students to suggest an expression for the blue pan that would cause the scale to balance. Some students suggested 15×2, but the scale didn't balance; it showed that the blue pan was heavier.



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Teaching Scenario: Secondary *continued*

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4 The next day, Ms. Naylor takes her class to the computer lab. She allows students to use the applet on their own to see what they can discover. She gives them a list of expressions to enter, and asks them to find equivalent expressions. Through this exploration, students realize that multiplication and division should be done before addition and subtraction. One student also realizes that multiplication and division must happen in order from left to right — for instance, the expression $4 \div 2 \times 3$ produces the correct answer of 6 if the division is performed first, but the incorrect answer 2/3 will be obtained if the multiplication is performed first.

As students work, Ms. Naylor noted, "The students didn't focus on the number above each pan. They didn't focus on the solution. They focused on *why*. This became a proof activity" for them, not just a computation exercise. The benefit of using the Illuminations tool, Ms. Naylor discovered, is that students are more willing to write out each step when simplifying complex expressions.

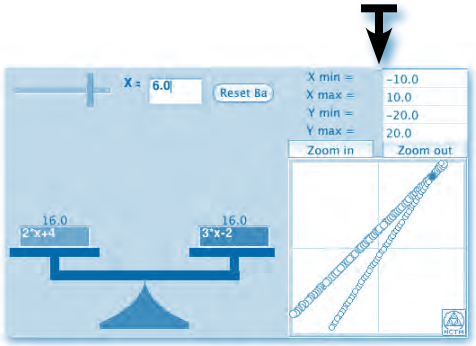
5 NCTM's *Principles and Standards for School Mathematics* suggests that students should develop conceptual understanding in addition to computational skills. Knowing this, Ms. Naylor wants to make sure that her students understand how the order of operations works, so she uses the **Old Stamps** problem from the Figure This! site, a resource from the National Council of Teachers of Mathematics that appears in the Illuminations' **Web Links** section.

The solution to the Old Stamps problem could be found with the expression $4 \times 33 + 3 \times 15$. Ms. Naylor asks her students:

- What is the value of this expression?
- What does this expression represent, in the context of the Old Stamps problem?
- How did you use the order of operations to determine the value of the expression?

> **"I love the activities on the Illuminations site! I teach in a small school with little money for software and technology, so this site is a huge help."**
>
> — Nichole Hoffman
> 7-12 Mathematics Teacher: Summit, S.D.

6 Later in the year, Ms. Naylor's algebra students will be learning to solve equations involving complex expressions. Knowing that Illuminations has over 60 interactive applets, she looks to see if there are others she can use with her class. She returns to the **Activity Search** page and searches for other grade 6-8 lessons on "algebra." In the list of results, she discovers the **Pan Balance – Expressions** activity. This applet is similar to **Pan Balance – Numbers**, so she is sure that students will have no trouble using it. However, instead of just entering numerical expressions, students can also enter expressions that involve variables. For instance, a student could enter $3 \times x - 2$ into the red pan and $2 \times x + 4$ into the blue pan; then, by adjusting the slider, the student could see that the pans are balanced and the graphs of the lines intersect when $x = 6$.



ReadWriteThink Mission Statement

ReadWriteThink provides educators and students access to the highest quality practices and resources in reading and English language arts instruction. Produced by the International Reading Association (IRA) and the National Council of Teachers of English (NCTE), the site features standards-based lesson plans and interactive student materials for the K–12 classroom.

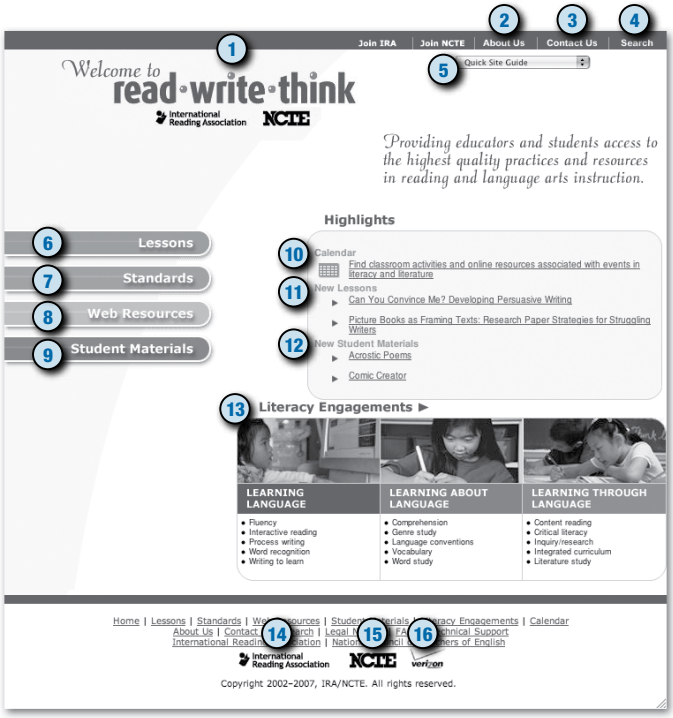
Using ReadWriteThink

From the Thinkfinity homepage, click on the Partner site logo, or type **www.readwritethink.org** in the address line of your Web browser, and click Enter or press Return.

The ReadWriteThink homepage appears.

The following numbered list corresponds to the screenshot on the right showing the features of the homepage.

1. Visit **ReadWriteThink** for standards-based, online reading and English language arts resources for K–12 educators and students.
2. Learn more **About Us**, ReadWriteThink, including information about the International Reading Association and the National Council of Teachers of English.
3. **Contact Us** to offer feedback and comment on the site.
4. **Search** ReadWriteThink and all of the Thinkfinity Partner sites.
5. Use the **Quick Site Guide** to access different areas of the site or to seek technical support.
6. Browse an extensive collection of reading and English language arts **Lessons**.
7. Learn more about the IRA/NCTE ***Standards*** *for the English Language Arts*.
8. Discover many useful reading and English language arts **Web Resources** reviewed by the ReadWriteThink Web Resources Review Panel.
9. Access a collection of interactive **Student Materials** that support literacy learning in the K–12 classroom.
10. Visit the **Calendar** for lessons, Web links, texts and classroom activities associated with important events in literacy.
11. Access **New Lessons** posted regularly to the site.
12. Explore **New Student Materials** recently added to the site.
13. Read more about the **Literacy Engagements**: learning language, learning about language, and learning through language.



14. Go to the **International Reading Association** Web site.
15. Access the **National Council of Teachers of English** Web site.
16. Access the **Verizon Foundation** Web site.

IRA and NCTE Mission Statement:

The **International Reading Association** is a community of reading professionals united by the mission to promote higher levels of literacy, reading, and communication by continuously advancing the quality of reading instruction and research worldwide.

The **National Council of Teachers of English** promotes the development of literacy, the use of language to construct personal and public worlds and to achieve full participation in society, through the learning and teaching of English and the related arts and sciences of language.

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ReadWriteThink: Features

www.readwritethink.org

Inside the ReadWriteThink Web Site

Common Features

Lessons

ReadWriteThink offers standard-based lesson plans that meaningfully integrate Internet content into the teaching and / or learning experience. Lessons can be selected according to grade band and area of literary practice: Learning Language, Learning about Language, and Learning through Language. ReadWriteThink lessons are written for teachers. They include student-ready materials such as student reproducibles, student interactives, and related Web resources. Key components within each lesson include:

- A **Theory to Practice** section showcasing ways strategies used within the lesson are derived from a research-based publication
- **Student Objectives** that clearly delineate the literacy skills and strategies that students will learn from the lesson
- An **Instructional Plan** that includes detailed, step-by-step instructions for easy classroom implementation
- Classroom-based **Student Assessment / Reflection** materials that can be used to measure student progress

Standards

To help educators integrate ReadWriteThink resources into a standards-based curriculum, all site content is organized around the IRA/NCTE *Standards for the English Language Arts*. These 12 national standards, developed by IRA and NCTE in 1996, describe the literacy skills and abilities that students must possess to thrive as independent learners throughout their lives.

The Thinking Behind Our Lessons

ReadWriteThink lessons are written and reviewed by experienced teachers and teacher educators. All ReadWriteThink lessons align with one or more of the national Standards for the English Language Arts, published by the International Reading Association and the National Council of Teachers of English. In addition to providing student objectives, a step-by-step instructional plan and classroom-based assessments, lessons on the site also incorporate technology usage, either for the teacher or the learner.

Student Materials

To enhance interactive learning, ReadWriteThink produces lessons that incorporate interactive student materials. These interactive tools are intended primarily to assist students with a reading or writing activity and have potential uses across the content areas. Popular tools include the Comic Creator, Letter Generator, Acrostic Poems, and Venn Diagram.

Click any of the tools in the Student Materials Index to reveal:

- An overview of the interactive tool and its potential classroom uses
- A direct link to the tool itself
- Links to ReadWriteThink lessons that use the interactive tool
- Support documents, including planning sheets, tip sheets, and the technical requirements for using the interactive tool in the classroom or computer lab

Web Resources

The Web Resources Gallery on ReadWriteThink includes links to instructional, professional development, reference, and student resources, which can be sorted by grade or resource type. Web Resources, reviewed by the ReadWriteThink Review Panel, adhere to a rigorous set of criteria.

Unique Features

Calendar

The ReadWriteThink Calendar highlights literary, historical, and cultural events of interest to classroom teachers. Click on an entry to display a brief description of the date's significance, as well as a classroom activity that relates to that event, related lesson plans, Web links and text resources.

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Reading and Writing in the Content Areas

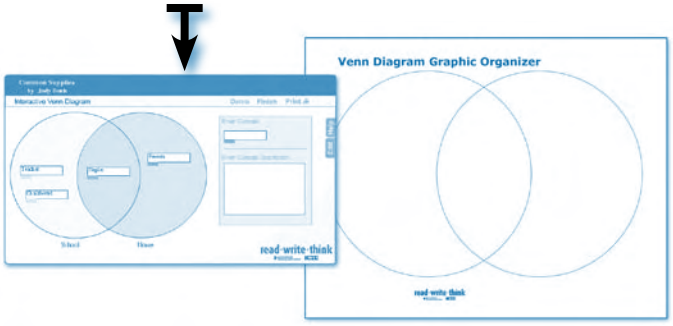
www.readwritethink.org

Teaching Scenario: Elementary (K-5)

Teaching in the content areas undoubtedly involves literacy instruction. Whether by solving a word problem in math class, learning new vocabulary in science class, or searching a historical figure in social studies, students need to be able to develop and apply their reading and writing skills. On the ReadWriteThink Web site, teachers can find lesson plans and other online resources to help them integrate literacy instruction across the disciplines.

Graphic Organizers

Graphic organizers are commonly used to organize information when reading or writing in the content areas. Ms. Bender would like to introduce her kindergarten students to the concept of compare and contrast using a Venn Diagram. She clicks the purple **Student Materials** tab, and accesses the **Venn Diagram, 2 Circles** tool. There she finds a number of lessons that use the Venn Diagram, including **Introducing the Venn Diagram in the Kindergarten Classroom**. In the Resources section of the lesson, she finds a **Venn Diagram Worksheet** and also the online **Two-Circle Venn Diagram Interactive**. Many of the lessons on ReadWriteThink include graphic organizers as student reproducibles and online activities.



Writer's Notebook

Writing in a journal or writer's notebook can be especially powerful when brought into the math and science classroom. Mr. Duncan is beginning a unit on plants. In the lesson "**How Does My Garden Grow? Writing in Science Field Journals**," he reads an article from *Language Arts*, an NCTE publication, which explains how students can use a journal to record their observations and respond to their own questions about the garden. The lesson "**I Wonder: Writing Scientific Explanations With Students**" offers another approach for Mr. Duncan. It draws on *Reading and Writing Nonfiction Genres*, published by IRA. By keeping up with publications in the field, Mr. Duncan can continue to improve his teaching skills.

Integrated Curriculum

Mr. DaSilva would like to expose his students to nonfiction authors and books to add variety to his class and stimulate more opportunities for reading and writing. One of his favorite nonfiction authors is Seymour Simon, so Mr. DaSilva conducts a **Search** of his name. He finds a calendar entry celebrating Simon's birthday on August 9th. After reading the calendar entry, Mr. DaSilva is thrilled because he finds resources for many of the topics he teaches: weather, the solar system, and animals. He knows that these books and activities will lead to authentic reading and writing activities in his class.

> **"My favorite part of writing for ReadWriteThink is the opportunity to explicitly link theory and practice. It is exciting to create materials that make these connections for classroom teachers."**
>
> — Maureen Carroll
> Educational Consultant: Groton, Massachusetts

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Teaching Scenario: Middle and Secondary (6-12)

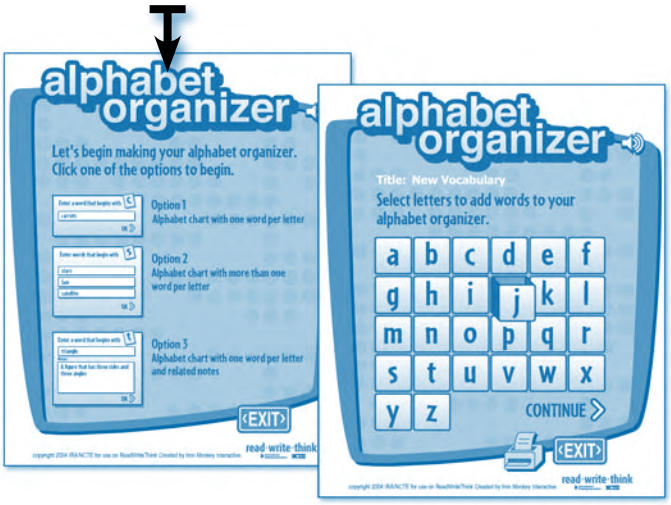
Many of the strategies used in the English Language Arts (ELA) classroom can be used while reading and writing in the content areas. Incorporating ELA strategies such as pre-, during-, and post-reading activities in a content lesson can provide students with the strategies necessary to support them as readers. The ReadWriteThink Web site provides lesson plans and other online resources to integrate literacy instruction across the disciplines.

Comprehension

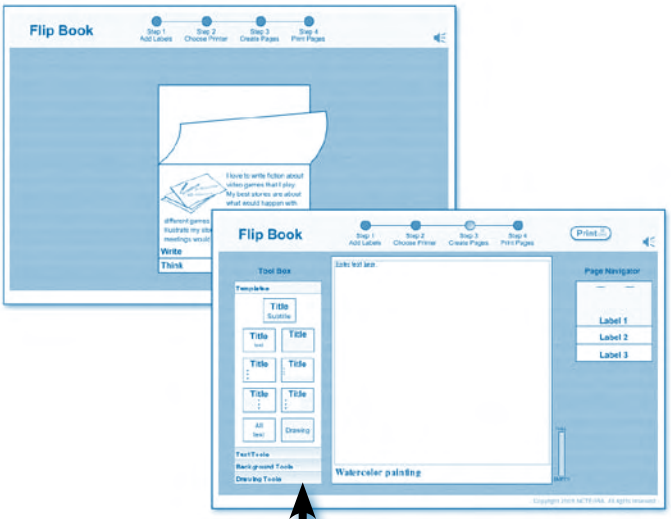
Teachers can use visual strategies and graphic organizers to activate prior knowledge to aid in comprehension of new content. While working on the activities in the lesson "**Persuasive Essay: Environmental Issues**," Mr. Largo shares the interactive **Persuasion Map** with his students. This interactive tool enables students to map out their arguments and print their notes to use in a class debate about environmental issues, or while writing a persuasive essay. In addition to the online Persuasion Map, the **Resources** section of the lesson provides Mr. Largo with a number of environmental Web sites for his students to explore to further enhance their experience with this topic.

Vocabulary

Ms. Goldman is a middle school teacher who has observed her students struggling with vocabulary in their assignments. Using the **Advanced Search** function to search only on the ReadWriteThink site, she searches for "**vocabulary**." From the results, Ms. Goldman selects the lesson plan "**ABC Bookmaking Builds Vocabulary in the Content Areas**." This lesson provides a vocabulary strategy that students will find useful in their other courses as well. In addition to providing a step-by-step instructional plan, the lesson makes use of the interactive **Alphabet Organizer**, in which students create alphabet books for the new vocabulary they are learning.



> **"The online interactive activities on your site are awesome! They allow me to reinforce what students are learning in class, while at the same time learning how to use the computer."**
>
> — Julianna Elguicze
> Classroom Teacher: Somerset, New Jersey



Inquiry / Research

Mr. Ryan, a high school teacher, is interested in finding alternatives to the traditional research paper. He knows that graphic organizers are a great way for students to visually represent the content covered in their readings and research, as well as to organize their writing. Mr. Ryan clicks on the **Student Materials** tab and finds a variety of graphic organizers that his students can use to share their research without writing a traditional paper. Mr. Ryan looks at the **Flip Book** and asks students to work in groups to publish their research findings using this tool. The **Multigenre Mapper** and **ReadWriteThink Printing Press** both offer additional publishing opportunities.

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New Literacies

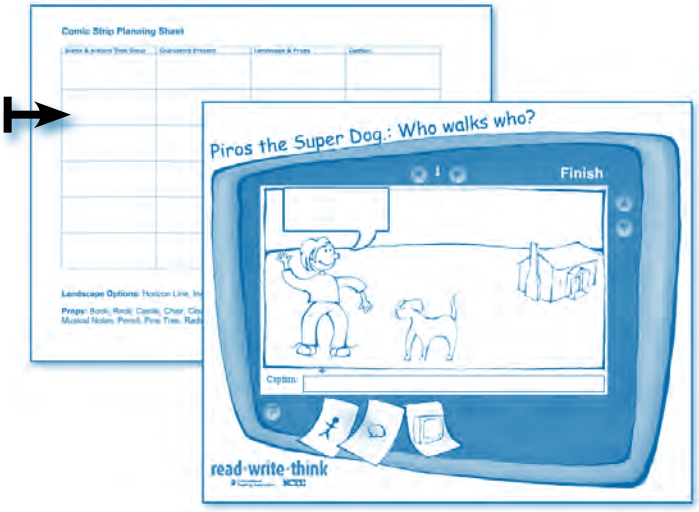
www.readwritethink.org

Teaching Scenario: Elementary (K-5)

Today's elementary students bring many experiences with a variety of texts to the classroom: print, music, online literacies, technical reading and writing, among others. The ReadWriteThink Web site provides teachers a way to connect students' out-of-school literacy experiences with those in the classroom.

Comics

Mrs. O'Leary knows that many students love to read comics and cartoons. While browsing the **Student Materials Index**, she finds the Comic Creator. On the related **Tool Card** she finds numerous lessons that will enable her to teach many reading and writing skills using comic books and cartoons, such as "**Book Report Alternative: Examining Story Elements Using Story Map Comic Strips**" and "**Buzz! Whiz! Bang! Using Comic Books to Teach Onomatopoeia**." Mrs. O'Leary is also pleased to find a **Comic Strip Planning Sheet** as she only has time in the computer lab once a week.



> **"I like the fact that ReadWriteThink lessons are written and reviewed by teachers who know what works in the classroom."**
>
> — Jennifer Soalt
> Literacy Specialist: Concord, Massachusetts

E-mail and Instant Messaging

Mr. Ramirez knows that many of his students use e-mail and instant messaging to talk to each other outside of school. He decides to use e-mail and instant messaging in his classroom while teaching about audience and purpose. Using the ReadWriteThink **Search** function, he types "**email & audience**" and finds two lesson plans that will be useful in his classroom. After looking at "**What's the Difference? Beginning Writers Compare E-mail with Letter Writing**" and "**Write Right Back: Recognizing Readers' Needs and Expectations for E-mail Replies**," Mr. Ramirez finds the **E-mail Abbreviation Student Interactive**, which can be used in a teacher presentation or as a student activity.

Music

Mrs. Wang observes her first-grade students singing songs during recess. She remembers reading an article in *The Reading Teacher* about how singing and songwriting can support early literacy. Interested in incorporating music into her class, Mrs. Wang accesses the **Advanced Search**, types "**music**," and selects **ReadWriteThink, grade 1**. Since she has just started teaching word families, she decides to use the lesson "**A-Hunting We Will Go: Teaching Rhyming Through Musical Verse**." After finishing the lesson, Mrs. Wang sees how much her students enjoyed the interactive **Word Build & Bank**, so she checks the **Student Materials Tool Card** to find other lessons that use that online activity.

Pop Culture

Ms. Shelley noticed that the same students who play with trading cards seem to be reluctant readers in the classroom. Using the **Search** function, she types "**trading cards**." Ms. Shelley finds the lesson plan "**Powerful Writing: Description in Creating Monster Trading Cards**" where students can combine art and writing to make their own trading cards. She is also excited to find an interactive **Character Trading Cards** tool in the ReadWriteThink **Student Materials Index** for students to create their trading cards online.

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Teaching Scenario: Middle and Secondary (6-12)

Today's media-savvy students compose and read texts that include print, still-images, video and sound. As a result of this view of literacy, reading and composing in today's classrooms must be expanded. On the ReadWriteThink Web site, teachers can find a variety of new literacies to use in the middle and secondary classrooms.

Television and Film

Mrs. Nielsen notices that while her students seem to have difficulty understanding literary elements in traditional texts, they have a true grasp of popular culture. This is obvious as she often hears her students recapping last night's TV line up. Mrs. Nielsen decides to capitalize on this in her English Language Arts classroom. She uses the **ReadWriteThink Search** and searches for "**television**" for grades 6–8 and 9–12 and checks the subject area as language arts. Mrs. Nielsen finds two lesson plans on **Critical Media Literacy**: one on **TV Programs** and one on **Commercial Advertising**. These lessons ask her students to reflect on the messages they are exposed to by watching television. Mrs. Nielsen then expands her search to "**film**," again checking off grades 6-8, 9-12 and language arts. She finds lesson plans in which students explore films, television shows, and scripts.

Online Texts

Mr. Reyes knows that his students have a great deal of experience in gathering information from print texts. He doesn't think they have been asked to think critically about the information they find online, even though they typically turn to the Internet as a first source. While scanning the **Lesson Index**, he finds "**Compare and Contrast Electronic Text With Traditionally Printed Text**," which invites students to consider the similarities and differences between electronic text and traditionally printed text, such as their textbooks. The lesson went so well that Mr. Reyes decides to follow it up with "**Exploring Literacy in Cyberspace**," which provides students with specific strategies to make meaning of what they read online, including the **Reading Think-Aloud Sheet**.

> **"ReadWriteThink brings a community of the nation's best English teachers to my computer desktop with just a click of the mouse."**
>
> — Junius Wright
> Classroom Teacher: Charleston, South Carolina

Music

Ms. Raminski notices many of her students listen to their MP3 players during lunch, so she searches for lesson plans that will invite students to bring their music into the classroom. Using the ReadWriteThink **Lesson Plan Selector**, on the drop-down menu, Ms. Raminski selects "**Learning Through Language**" and "**Media Literacy**." She finds numerous music-related lesson plans, including "**Audio Listening Practices: Exploring Personal Experiences with Audio Texts**," which asks students to explore the ways that audio texts play a role in their lives. As a follow-up activity, Ms. Raminski implements the lesson plan "**Copyright Infringement or Not? The Debate Over Downloading Music**," which refreshes the traditional high school debate.

Science NetLinks
AAAS

www.sciencenetlinks.com

Science NetLinks Mission Statement

Science NetLinks, produced by the American Association for the Advancement of Science (AAAS) — the world's largest general science organization, is your comprehensive online resource for quality science content. Science NetLinks strives to provide a wealth of engaging, standards-based materials, such as lesson plans, interactive tools and expert-reviewed Web sites.

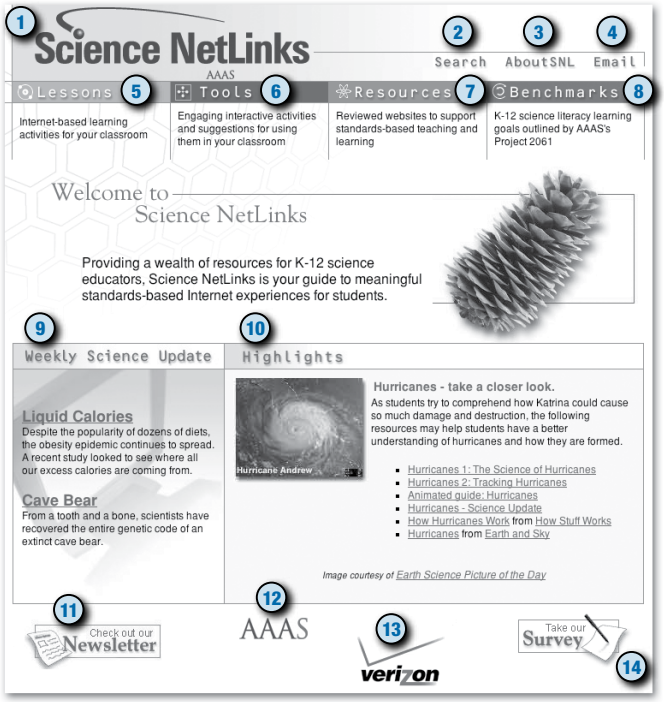
Using Science NetLinks

From the Thinkfinity homepage, click on the Partner site logo, or type **www.sciencenetlinks.com** in the address line of your Web browser, and click Enter or press Return.

The Science NetLinks homepage appears.

The following numbered list corresponds to the screenshot on the right showing the features of the homepage.

1. Explore **Science NetLinks**, a showcase of standards-based, online resources for K–12 educators.
2. **Search** Science NetLinks and all of the Thinkfinity Partner sites.
3. Learn **About SNL**, its key site features, updates and site developers.
4. Send feedback via **Email**, or sign up to receive the Science NetLinks Newsletter.
5. Discover Benchmark-aligned **Lessons** that incorporate research-based instructional strategies to support student learning.
6. Go to **Tools** for engaging interactive activities and suggestions for using them.
7. Find the best-reviewed **Resources** for your science teaching needs.
8. Learn about the K–12 **Benchmarks** *for Science Literacy* with age-appropriate learning goals.
9. Explore **Science Updates**, an engaging topical lesson that includes audio clips highlighting the latest in science research.
10. Check out **Highlights** for a showcase of featured content.
11. Review the **Science NetLinks Newsletter** for science education news and resources.
12. Visit the **American Association for the Advancement of Science** (AAAS) site.
13. Access the **Verizon Foundation** Web site.
14. **Take Our Survey** to help improve the site.



AAAS Mission Statement:

American Association for the Advancement of Science (AAAS) seeks to advance science and innovation throughout the world for the benefit of all people. To fulfill this mission, the AAAS Board has set these broad goals:

- Foster communication among scientists, engineers, and the public
- Enhance international cooperation in science and its applications
- Promote the responsible conduct and use of science and technology
- Foster education in science and technology for everyone
- Enhance the science and technology workforce and infrastructure
- Increase public understanding and appreciation of science and technology
- Strengthen support for the science and technology enterprise

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Science NetLinks: Features

www.sciencenetlinks.com

Inside the Science NetLinks Web Site

Common Features

Lessons

Science lesson plans can be found by clicking **Lessons** from the Science NetLinks homepage. Lessons are sortable by title, grade and Benchmark. Be sure to check out the Newest Lessons in the left-hand box of the Lesson Index page.

Standards

The **Benchmarks** section of the site lists the 12 topic areas of the AAAS Project 2061, *Benchmarks for Science Literacy*. These Benchmarks cover learning goals for the end of grades 2, 5, 8 and 12, and they share over 90% of the content of the National Science Education Standards.

Student Materials

Don't miss the Science NetLinks **Tools** feature, available from the Science NetLinks homepage. The **Tools** section includes some of the best online activities created by Science NetLinks or found in Science NetLinks-reviewed **Resources**. The Tool Index allows you to sort quickly through this collection of online experiences. Be sure to look for printable student sheets, student E-Sheets and interactive student activities throughout Science NetLinks lessons. Icons in the Lesson Index indicate the lessons that include these engaging features.

Web Links

Science NetLinks connects you to a treasure trove of Web sites related to the Benchmark topics. Simply click **Resources**. You can choose resources by grade level and Benchmark. Each of these sites has been reviewed by the Science NetLinks Board of Reviewing Editors and can be accessed from the review page that precedes them by clicking the URL under the site name.

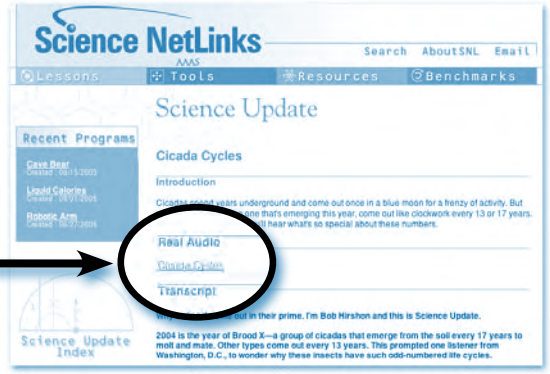
The Thinking Behind Our Lessons

All Science NetLinks lessons follow pedagogy guidelines recommended by Project 2061 as essential for effective learning and teaching. Each lesson is tied to at least one learning goal. The lessons are written for the teacher, but include student-ready materials such as student sheets (student reproducibles) or E-Sheets (online worksheets that enable students to engage directly in Internet activities).

Unique Features

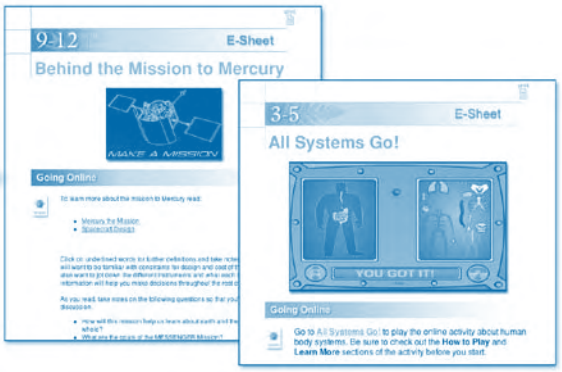
Science Updates

Science Updates is a collection of engaging, topical science lessons that bring the latest science research and discovery to your classroom. Each Science Update contains an **audio feature** interview with a scientist or researcher as well as a transcript and lesson. Every Science Update is cross-referenced to benchmarks and provides links to Web sites related to the specific activity and topic.



Student E-Sheets

Student E-Sheets coincide with Science NetLinks lesson plans. They are online resources used by the students that provide step-by-step instructions to help guide students through Web activities.



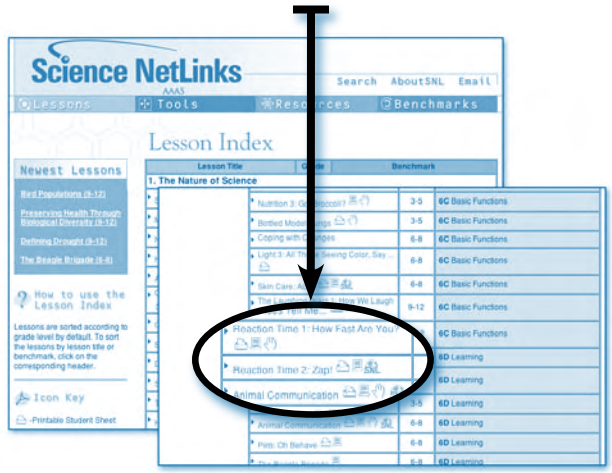
Teaching Scenario: Elementary

www.sciencenetlinks.com

Setting the Stage

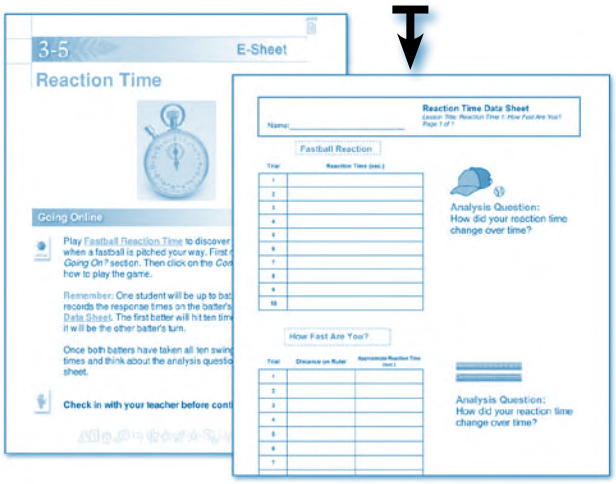
Mr. Sanchez is looking for materials that address specific standards regarding the ways people learn. He is hoping to find activities that will engage his fifth-grade students and provide opportunities to discover the process of learning.

1 Being familiar with the Science NetLinks Web site, Mr. Sanchez knows that all of the resources are standards-based and searchable by benchmark. He starts by visiting the **Lesson Index** page and sorts the lessons by benchmark. Mr. Sanchez scrolls down to The Human Organism: Learning benchmark area, and finds the 3-5 lesson series, **Reaction Time 1 and 2**, which addresses the learning goals he is teaching. He also can tell by looking at the icons that these lessons provide **printable student sheets**, **online student E-Sheets**, **online interactives** and **hands-on activities**. After reviewing the lessons, Mr. Sanchez decides that these materials will provide him with what he needs for his class.



2 Mr. Sanchez starts by using the lesson **Reaction Time 1: How Fast Are You?** This lesson encourages students to think about their own learning and learning strategies. After a general discussion about reaction time in which students share their own experiences, Mr. Sanchez lets students know that they will use an online activity to observe and analyze their reaction time. In the computer lab, students use the **Reaction Time E-Sheet**, which Mr. Sanchez had bookmarked earlier, to access the activity, **Fastball Reaction Time**. In this activity, students discover the process of reacting to a cue and how repeated practice can impact on the end result. As students conduct this activity, they record their data on the student sheet, **Reaction Time Data**. Once students have finished this activity, Mr. Sanchez gives them time to analyze their data and describe how their reaction times changed over time. Mr. Sanchez brings the class back together to discuss their experience with this activity and ask students to share the strategies they used to improve their response times.

> **"Science NetLinks is a great Web site for teachers who need or want resources to supplement their science programs. The site has lessons, tools, and resources for all grade levels. It is incredibly clear and easy to navigate, so I don't waste any time looking for what I want."**
>
> — Renee Goularte
> Classroom Teacher: Magalia, California



3 The next day, Mr. Sanchez picks up where he left off with teaching about reaction time. Since he does not have access to the lab today, Mr. Sanchez has printed out the instructions for the activity, **How Fast Are You?** Students again work in pairs to test their reaction time by catching a ruler in mid-air. Before starting the activity, Mr. Sanchez asks students to reflect on the similarities and differences between this activity and the **Fastball Reaction Time** activity, allowing students to make connections and begin to form inferences about today's activity. As students test their ruler-catching abilities, they record their reaction times, analyze data, and discuss results and performance strategies as a class.

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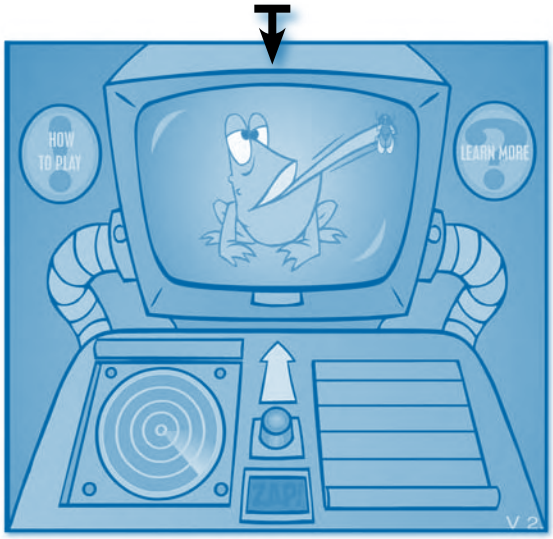
Teaching Scenario: Elementary *continued*

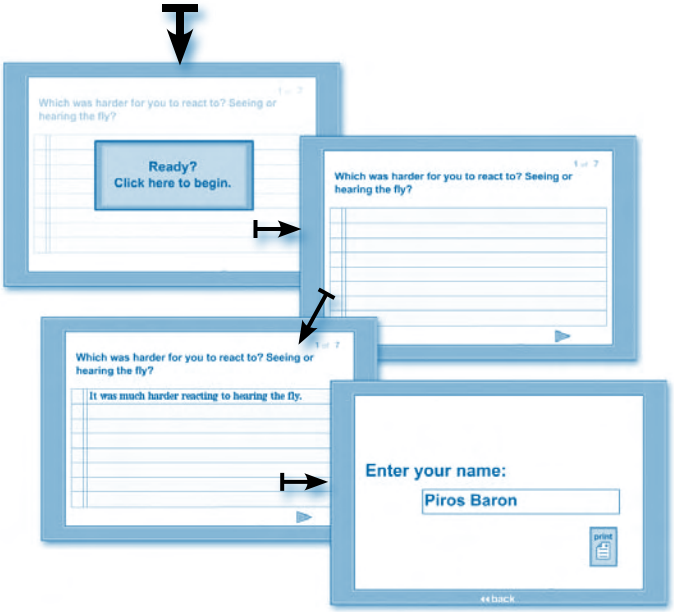
www.sciencenetlinks.com

4 To conclude the lesson, Mr. Sanchez has students determine skills and strategies they could use to teach younger students how to improve their reaction time when conducting similar activities. Students also reflect on other skills that can be improved or mastered with practice, drawing upon their own experiences. Identifying the process of learning in everyday experiences provides students with a relevant context to which they can apply what they have learned.

5 Because students responded so well to the online activity, **Fastball Reaction Time**, Mr. Sanchez decides to continue with the second lesson, **Reaction Time 2: Zap!** which also has an online activity, **Zap!** As part of this activity, students test their visual and auditory abilities by directing a frog to catch a fly. They quickly learn that there are very different skills and strategies for reacting to each. Mr. Sanchez decides that this activity would work best in the computer lab where students have their own computer and headphones. Once in the lab, students are directed to the online **E-Sheet, Zap!** which allows them to follow the activity at a self-directed pace. To save time, Mr. Sanchez previously copied and distributed the student sheet, **Zap! Reaction Time Data**. As students play the activity and test their reaction times, Mr. Sanchez is able to walk around the room and check-in with students individually, making sure students understand the goal of the activity and are collecting data accurately. Mr. Sanchez observes a student haphazardly clicking the reaction button before the cue is provided. Eventually the student stops clicking and waits for the cue. Mr. Sanchez takes a moment to discuss with the student why she repeatedly clicked, but then stopped. The student responds that she thought repeated clicking would improve her response time, but learned it actually made her response time sporadic. Mr. Sanchez points out that she has learned a better strategy.



6 As students complete **Zap!** and analyze their data, they can answer questions using an online question and response tool. Mr. Sanchez tells students that if time allows, they can respond to the questions online. If students run out of time, though, he has a printed version that they can complete back in the classroom.



7 **Suggestions for follow-up activities:**

Have students design and conduct their own test of human response time. For example, do students have a faster response time using the hand that they write with or the opposite hand? Are students' times the same when they listen to music?

> **"Science NetLinks has been very helpful to me as I am teaching Science for the first time in several years. I was able to access lesson plans and information about our required curriculum."**
>
> — Faye King
> Elementary Teacher: West Paducah, Kentucky

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Teaching Scenario: Secondary

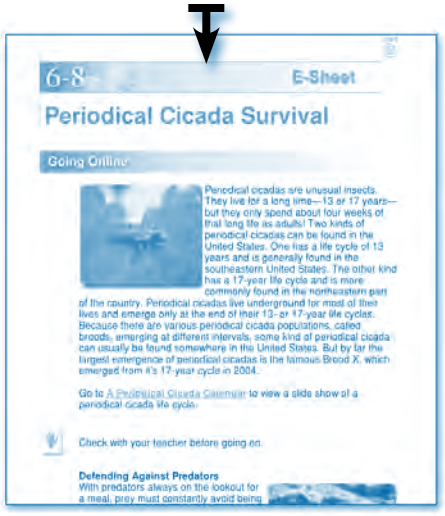
www.sciencenetlinks.com

Setting the Stage

Each Monday, Ms. Bolster begins her 6th grade science class by having a student bring in and present a current events article that involves science. One of her students brings in an article from the Style section of the newspaper with a headline that reads "Cicada Invasion Heading Our Way." The class is very curious about the cicadas. One student asks if they are the same thing as crickets. Many students find it hard to believe that cicadas could have such unusual life cycles and a few students actually seem concerned about what it would be like to have so many cicadas in and around their neighborhood. But the thing that seems to fascinate the students most about the article is the description of the noise made by the cicada. Because the class has just finished learning about predator / prey relationships and defense mechanisms, Ms. Bolster thinks that cicadas could provide an ideal context for students to apply what they have learned from their texts.

1 Ms. Bolster searches the Thinkfinity resources for cicada materials and is pleased to find many resources. As she reviews the resources, she discovers a number of them focus on the periodical cicada. Ms. Bolster decides she will start by discussing the annual cicada with which many students would be more familiar before teaching about the periodical cicada, which has a more unique life cycle. She recognizes that this will dovetail nicely with the unit they recently finished on animal survival techniques.

2 Ms. Bolster starts the lesson by determining what students already know about cicadas. As a class, they share cicada sightings, hypothesize about the sounds and discuss the annual cicada life cycle. Ms. Bolster then explains that they will learn more about cicadas by studying a unique brood of the insect. Because there is only one computer with Internet access in the classroom, Ms. Bolster distributes copies of the online **E-Sheet**, **Periodical Cicada Survival**, found in the lesson of the same name, and connects the computer to a television to display the resource to the whole class. Using the printed E-Sheet, students are introduced to the periodical cicada.


6-8 E-Sheet

Periodical Cicada Survival

Going Online

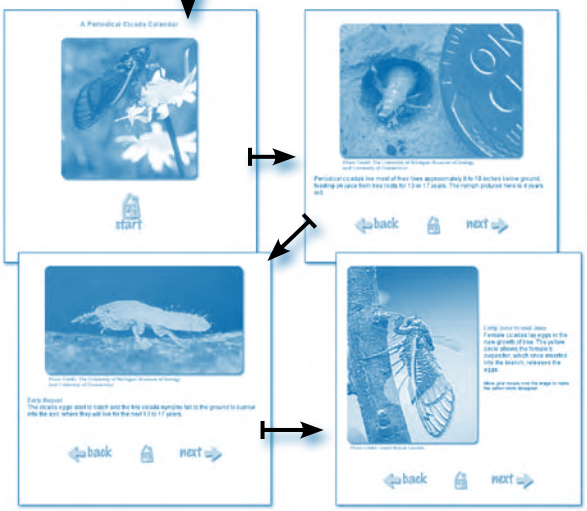
Periodical cicadas are unusual insects. They live for a long time—13 or 17 years—but they only spend about four weeks of that long life as adults! Two kinds of periodical cicadas can be found in the United States. One has a life cycle of 13 years and is generally found in the southeastern United States. The other kind has a 17-year life cycle and is more commonly found in the northeastern part of the country. Periodical cicadas live underground for most of their lives and emerge only at the end of their 13- or 17-year life cycles. Because there are various periodical cicada populations, called broods, emerging at different intervals, some kind of periodical cicada can usually be found somewhere in the United States. But by far the largest emergence of periodical cicadas is the famous Brood X, which emerged from it's 17-year cycle in 2004.

Go to A Periodical Cicada Calendar to view a slide show of a periodical cicada life cycle.

Check with your teacher before going on.

Defending Against Predators
With predators always on the lookout for a meal, prey must constantly avoid being

3 As a class, students view the online book, **Periodical Cicada Calendar.** This online book gives a pictorial view of the cicada life cycle and encourages students to begin thinking about cicada survival. Again, using the E-Sheet, students learn more about prey defense strategies and the survival strategy called predator satiation. Ms. Bolster assesses student understanding by having them answer some comprehension questions directly related to the learning goals.



4 **Extending the lesson:**

- To learn more about predator satiation, students can listen to the **Science Update: Cicada Cycles**, an audio interview with an expert explaining why the cicada's odd-numbered 13- and 17-year life cycles actually protect them from predators with even-year life cycles.
- In the lesson, **Birds of Prey**, students explore the predator / prey relationship by researching specific examples of birds and the foods they eat to survive.

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Teaching Scenario: Secondary

www.sciencenetlinks.com

Setting the Stage

Ms. Birch, a high-school Earth Science teacher, is looking for an interactive that her students can access independently to use as a basis for a group research project to help them understand the role of technology in space exploration. She would like this project to be primarily an out-of-class assignment with the opportunity to check-in with groups during class.

1 Using the **Tool** Index, Ms. Birch finds the Tool for the interactive **Make a Mission**, which provides suggestions for using the interactive and points to the 9-12 lesson, **Behind the Mission to Mercury**. After reviewing the lesson, Ms. Birch sees it as an ideal resource because it provides students with the opportunity to assess the goals, benefits, successes, and limitations of technology on a space mission. Also, the lesson challenges students to apply what they have learned by designing an instrument for the Mercury Mission. Ms. Birch believes that this opportunity to apply the concepts provides an effective way to help her assess student learning.

2 After introducing the **MESSENGER Mission**, Ms. Birch directs students to the online **E-Sheet**, **Behind the Mission to Mercury**. She explains that this E-Sheet will provide instructions, research suggestions, an interactive, and a research / design project that they will work on independently. The E-Sheet also includes guiding questions that Ms. Birch can use to check for understanding.

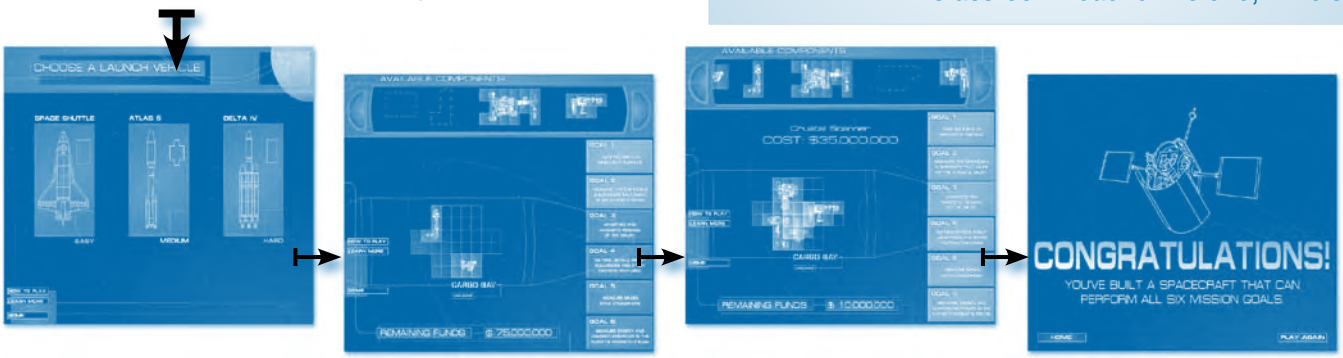
3 Once students gain a better understanding of the **MESSENGER Mission** and spacecraft design, Ms. Birch devotes 10 minutes to a discussion of a question from the lesson plan, "How will this mission help us learn about earth and the solar system as a whole?" She uses the discussion to help the class connect the earth and space science concepts they studied previously to the current lesson. She then directs the students to the online interactive, **Make a Mission**, which challenges them to prepare a spacecraft for a mission to Mercury. This interactive lets students explore some of the trials scientists face when planning a mission, especially cost and design constraints.

4 Once students have explored the interactive and considered cargo space and cost issues, they propose, test, design and create blueprints for one of the eight key instruments for the **Mercury Mission** using project guidelines and directions provided on the reproducible student sheet. Ms. Birch knows that to become good problem solvers, her students must develop drawing and modeling skills along with the ability to record their analysis, suggestions and results in clear language. This project lets them practice these skills.

5 **Taking it Further:**

- The **Science Update: Mars Hotel**, an audio interview with an expert, covers advances in technology that might make that long journey to Mars more pleasant.
- In the lesson, **Designing a Space Station**, students assess and evaluate a proposed space station design plan.

> **"To make science more accessible for students, I feel that it is important to make the topics as visual as possible. I was pleased to find the Tools available on the Science NetLinks site. Students were able to use them on their own, or I integrated them into my class discussions."**
>
> — David Fink
> Classroom Teacher: Tolono, Illinois



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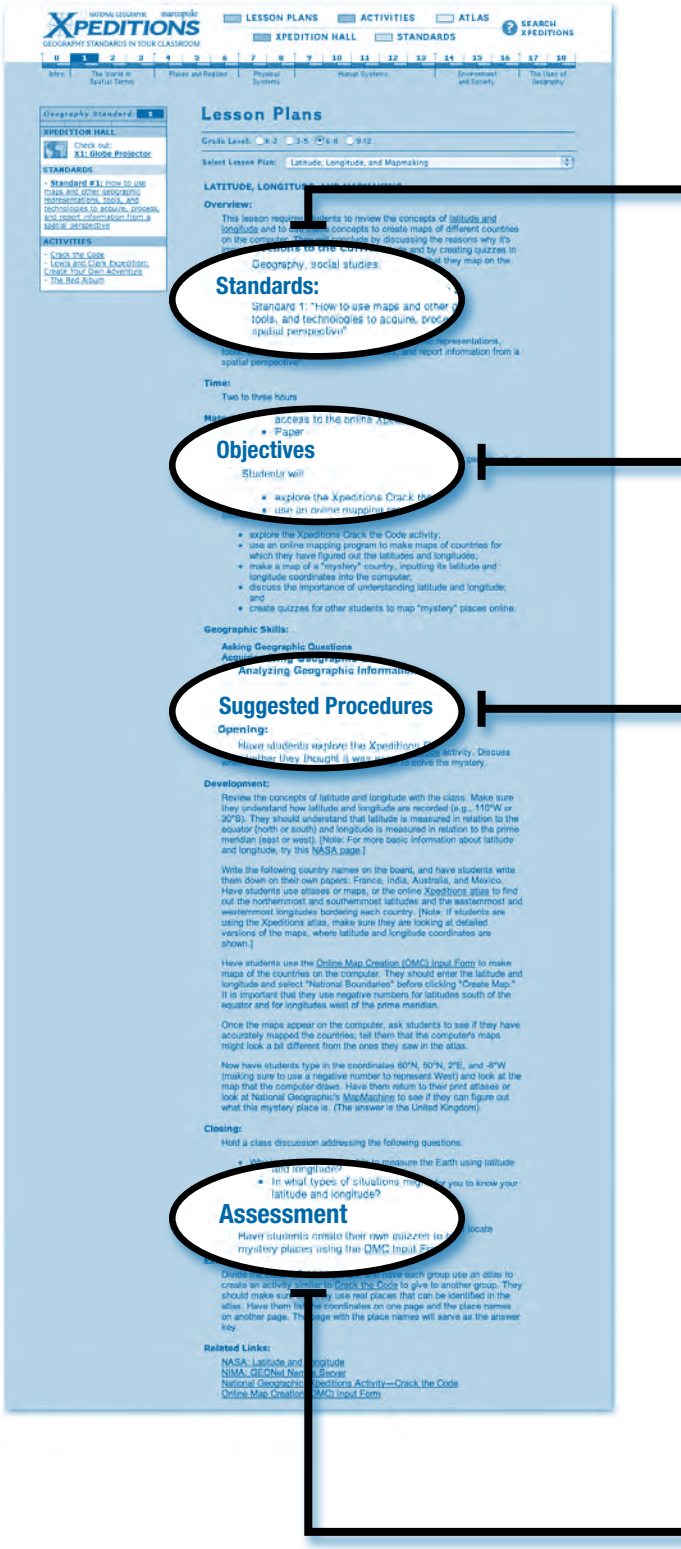
Thinkfinity Framework for Integrating Online Resources

Thinkfinity provides a vast number of high quality, standards-based educational resources. These resources become even more powerful when educators are able to think critically about how they will integrate a Thinkfinity resource into their instruction. The Thinkfinity Integration Framework provides educators a structure for thinking about how to effectively embed a learning object into their teaching to enhance student learning.

Types of Thinkfinity Online Resources

The definitions given for the following terms are specific to the Thinkfinity Integration Framework. The terms are used to describe the two main categories of resources found in Thinkfinity.

Learning Objects	Learning objects are individual resources designed for teacher or student use within a learning activity that can be implemented in a classroom, at home, or within an "out of classroom" setting. Learning objects are embedded within Thinkfinity lesson plans and other activities, but most can also be used independently to form learning activities that enrich existing lesson plans or "out of classroom" activities. Individual learning objects are considered online or offline, depending on how each will be used. Online learning objects are designed to be used on a computer, and in many cases are interactive in nature. Offline learning objects are designed to be downloaded and printed.
Lesson Plans	Lesson plans that are developed by one of Thinkfinity's Content Partners provide a complete framework, including instructional objectives, national standards, instructional strategies, assessment, and more. Lesson plans embed the learning objects that are required for implementation.



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National or State Standards

Objectives

Suggested Procedures

Learning activities are the building blocks of a lesson plan. They are the activities that students will engage in to meet the lesson objectives.

Most lesson plans are designed using multiple learning activities that together will help students learn the desired content.

The "Thinkfinity Integration Plan" (see pgs. 50-51) will help educators design a learning activity using one or more Thinkfinity learning objects to integrate within a lesson plan.

Learning Activity using one or more Thinkfinity **Learning Objects**

Integration Strategies:

- Which type of Thinkfinity learning object is this?
- Where will I use this learning object in the instructional cycle?
- Which instructional strategies will I employ?

Implementation Strategies:

- How will I configure my classroom for the learning activity?
- How will I manage implementation?
- What additional considerations will support successful implementation?

Learning Activity Development:

- What will students be asked to do?
- How will the learning activity address students' individual needs?
- How will I know if the learning activity was effective?

Assessment

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Thinkfinity Integration Plan

This Integration Plan uses the Thinkfinity Framework for Integrating Online Resources *(see p. 48-49)* as a tool to guide educators to think critically about how to successfully integrate Thinkfinity's online educational resources to improve student learning. A blank Integration Plan may be found on the Thinkfinity Web site at: *http://www.thinkfinity.org/documents/training_resource/Integration_Plan_Template.doc*

General Information	
Name: *Tina Teacher*	**District/School or Organization:**
Subject Area/Topic: *Math - Factoring*	**Grade Level(s):** *3-5*

Part 1: List the appropriate standards (State or National Standards for Content, Technology or 21st Century Skills) and one or more Thinkfinity object(s) aligned to the standards.

State or National Standards	Name of learning object(s) / URL(s)
NCTM Standards *Understand meanings of operations and how they relate to one another* *Compute fluently and make reasonable estimates*	*Factor Game* *http://illuminations.nctm.org/ActivityDetail.aspx?ID=12*

Part 2: Determine instructional elements—***Integration***

A. Which type of Thinkfinity learning object is this?	B. Where will I use this learning object in the instructional cycle?	C. Which instructional strategies will I employ?
Learning Object for Teacher Use ☑ Online (requires a computer) ☐ Offline (no computer required) **Learning Object for Student Use** ☑ Online (requires a computer) ☐ Offline (no computer required)	☐ Opening Motivational Activity ☑ Central Focus of Lesson Plan ☐ Research Tool for Students ☐ Closure Activity ☐ Assessment Tool ☐ Remediation Tool ☐ Enrichment Tool	☐ Direct instruction ☐ Indirect instruction ☑ Experiential learning ☐ Independent study ☐ Interactive instruction ☐ Other **Notes:** Visit *http://olc.spsd.sk.ca/DE/PD/instr/index.html* for more information on the instructional strategies listed.
Notes: *Groups of students will solve a problem, by coming up with strategies for winning the game.*		

Part 3: Plan for student success—***Implementation***

A. How will I configure my classroom for the learning activity?	
Classroom Configuration: ☐ Computers not needed—printable resource ☑ Whole group instruction, using a projector and / or interactive white board ☐ Whole group activity, with small groups using mobile laptops simultaneously ☑ Small group, using classroom computers or mobile laptops as rotating stations ☐ One to one, using classroom computers or mobile laptops as rotating stations ☐ One to one, in a computer lab setting ☐ One to one, with individual student laptops ☐ Other	**Notes:** *The mobile laptop cart has 15 computers. I will only need 10 computers to put students in groups of 3.* *Projector needed to model the activity.*

B. How will I manage implementation?	
Classroom Management: ☐ General computer rules / procedures ☑ Specific directions for activity ☐ Helping Hands ☐ Other	**Notes:** *I will create a direction sheet for students to follow, so it is clear that each student will have a chance to observe, and 2 turns to play the game. This sheet will also have the guiding questions listed on it.*

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Part 3 *continued*

C. What additional considerations will support successful implementation?

Classroom Management:	Notes:
❑ Software ❑ Hardware ❑ Supplemental Materials ☑ Other	*Wireless Internet connection*

Part 4: Develop the student learning activity

A. Describe the learning activity. What will students be asked to do with the Thinkfinity learning object(s)?

Students will get in groups of 3 to play the game. 2 students will play against one another, while the 3rd student observes the strategies used by the players. The following questions will guide the observation:

- *Give an example of something that one of the players did, that you would consider a "good move"? Explain.*
- *Give an example of something that one of the players did, that you would consider a "bad move"? Explain.*
- *In your opinion, what is the best 1st move of the game? Why is it the best move?*
- *Do you think that someone playing the game for a second time would have a better chance of winning, than someone who is playing the game for the first time? Why?*

Students will play 3 games, rotating positions so that each student gets a turn to observe. After all 3 games have been played, the 3 students will discuss the guiding observation questions.

B. Describe how the learning activity will address students' individual needs—*Differentiation*

- *The Factor Game has 3 different levels, a board with 30, 49, or 100 as the highest number to factor. Students who need more of a challenge can play at a higher level.*
- *Students who need extra support may use a multiplication chart during the game.*
- *Different learning styles are addressed—students play the game (concrete experience) and observe others playing the game (reflective observation).*

C. Effectiveness—What indicators will I expect to see / hear from students, which will inform me about the effectiveness of the learning activity?

As students are playing the game, I will circulate around the classroom, observing students playing the game, and discussing the questions with groups. I will look for students playing the game to strategically choose numbers based on the factors that are left on the game board during that turn. I will also look for students to choose all of the factors for the number chosen, indicating automaticity with multiplication facts. I will listen for students to describe the winning strategy—picking the number on the board that has the largest difference between itself and the sum of the factors that are left on the board.

Part 5: Do a complete trial run of the learning activity you described in step 3D.

Reflect on the learning activity.

Considerations:

- *It took me about 5 minutes to play one game, so I will allow 10 minutes for students to play one game and rotate positions—30 minutes total.*
- *I will need to model this game for students using a projection device, before they play. I will only play a partial game, because I want the students to experience the game themselves to figure out the winning strategies, instead of watching me employ the strategies.*
- *A player cannot pick a number that does not have any factors left on the board—will lose a turn. This will factor into strategy. They have to pick a number, not only with factors (composite), but also with a factor left on the board.*
- *Factors can't be picked more than once.*

Part 6: Consider the bigger picture

Describe how this learning activity fits within a lesson or unit plan, to meet objectives that will be assessed.

NOTE: Information about additional learning activities or materials that will be used to complement this learning activity may be included.

Prior to this learning activity, students will first receive instruction on the concept of multiplication and factoring. They will use Base-10 blocks to build models of multiplication, and draw arrays using graph paper. After students understand this concept, the Factor Game will help them practice factoring and committing multiplication facts to memory. After the initial whole-class lesson using this game, and discussing strategy, I will encourage them to practice multiplication tables and factoring at school and at home, and give them additional opportunities to play the game to help them apply their skills.

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Technology Definitions

What Is…?

BANDWIDTH: The capacity of a network or data connection to transmit data. T1 and DSL connections are considered high bandwidth while a dial-up connection is considered low bandwidth.

BLOG: Also called a Web log, blogs are shared on-line journals where people can post diary entries about their personal experiences, hobbies, etc.

BOOKMARK: Also known as a Favorite, a bookmark is a way of setting the browser to remember how to return to a certain Web page. Click the Web page name in your Bookmarks list to return to the page.

DOWNLOAD: This important function allows you to acquire files, software and other types of information from the Internet and store them in your computer.

FIREWALL: Firewalls are frequently used to prevent unauthorized Internet users from accessing private networks connected to the Internet.

FILTERING: Internet filtering blocks access to certain sites and is a general method to provide safe access for kids.

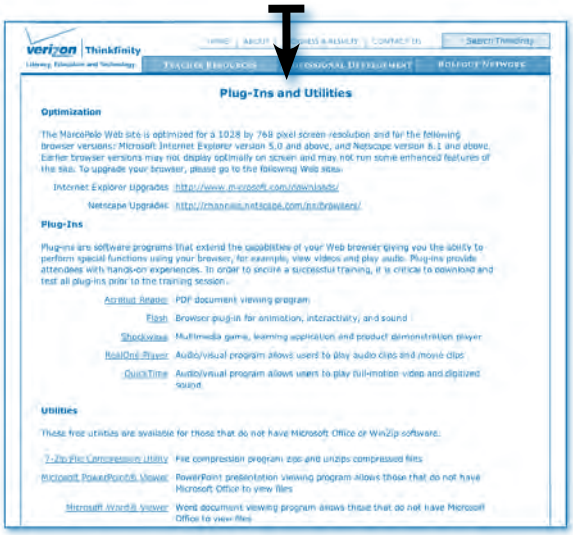
FRAMES: Some (but not all) Web sites use frames to organize content. Frames can present a table of contents or an index as a sidebar. A good indication that a Web site organizes its pages using frames is the presence of multiple scroll bars. Also, the URL does not change as you click through a site that uses frames.

GIF / JPEG: The two most commonly used formats for Web graphics. Graphic Interchange Format files are more suited for illustrations and graphic art while Joint Photographic Experts Group files are generally more suitable for photographs.

POP-UP: A window that suddenly appears (pops up) when you select an option with a mouse or press a special function key.

PLUG-INS: Plug-ins are software programs that extend the capabilities of your Web browser, including the ability to play audio samples (RealOne plug-in) or view video movies (QuickTime plug-in). If you can't hear or see a file on a Thinkfinity Web page, it's probably because you need a plug-in for that multimedia format. Plug-ins can be downloaded from the Internet and housed in a plug-ins folder in your computer. Common plug-ins are Acrobat Reader, Macromedia Shockwave and Flash, RealOne Player and QuickTime.

Access the Thinkfinity Plug-Ins and Utilities page at: *http://www.thinkfinity.org/plug_in.aspx*



SEARCH ENGINE: This Internet tool searches for Web pages that include the information you request. The most popular general search engines are Google® and Yahoo!®. Large Web sites such as Thinkfinity often have their own internal search engines that index the information throughout the site. (See a description of Thinkfinity's Search Engine in this guide.)

URL: A Uniform Resource Locator (URL) is the address of a Web page. Often a URL is given without the "*http://*" since most Web browsers automatically enter it for you. The URL for Thinkfinity is *www.thinkfinity.org*.

WEB BROWSER: A Web browser is one kind of software you can use to navigate the World Wide Web. Browsers let you see Web pages by translating Web layout code into visible text, images and sound. Microsoft Internet Explorer and Safari are two of the more popular browsers used today. Microsoft Internet Explorer can be downloaded for free from the Microsoft Web site; Safari can be downloaded for free from the Apple Web site.

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Technology How To's

How Do You...?

CREATE A BOOKMARK / FAVORITES: A bookmark can be created for any Web page currently in view, except pages organized by frames (see previous page). In Microsoft Internet Explorer, click **Favorites** at the top of the menu bar and then **Add to Favorites**. In Safari, click the word **Bookmarks** on the top menu bar, and select **Add Bookmark**.

You also can use bookmarks as a classroom management tool by saving your bookmark list as a separate file. This permits you to prepare customized student bookmark files, host multiple bookmark lists on one computer and even transfer those bookmark files to other computers.

To save a bookmark list as a separate file, within the Internet Explorer window, select **File**, then **Import and Export** and follow the directions to **Export Favorites** to create a **Favorites** file, naming it and saving it on your computer, onto disk or CD, or other mode. You can then **Import** that file onto other computers using the same process. Now your favorites are all accessible on another computer.

To open a bookmark list that has been saved as a separate file, within the Internet Explorer window, select **File**, and **Import and Export** then follow the directions to **Import Favorites** onto other computers.

DOWNLOAD A FILE: Downloading the file of your choice is usually as simple as clicking the **Download** button offered by that Web page. The file will be saved right into your computer's hard drive. Usually the download program will ask you to select a destination folder for the downloaded file. If the downloaded file arrives as an installer, clicking the **Install** or **Set Up** icon will place the file where you designate.

COPY AND PASTE A URL: To copy and paste a URL into a Word document, highlight the URL in the address bar of the browser window, then click **Edit**, then **Copy**. Once in the Word document, click **Edit**, then **Paste**. Within the Word document you may have to press the Enter key at the end of the URL to make it a live, "clickable" link.

OPEN OR CLOSE A NEW BROWSER WINDOW: You can open multiple Web browser windows at the same time. To do so, simply go to **File**, then **New**, then **Window** (if using a PC), or **File**, then **New Window** (if using a Mac). To close a window, simply click the **X** in the top-right corner (PC) or top-left corner (Mac) of your browser window.

PRINT FRAMES: To print a frame, you must click within the frame you wish to print before selecting **Print**. Otherwise you may end up printing the frame where you last clicked the mouse. For example, to print this map of Africa from Xpeditions, if it were located in a frame on a Web page, you would first click the map. To print in Microsoft Internet Explorer, select **File** on the top menu bar and then **Print**. Under the **Options** tab choose **Only the selected frame**. In Netscape, select **File** on the top menu bar and then **Print Frame**.

DOWNLOAD A PLUG-IN: If you encounter a Web page on the Internet that requires a plug-in, you will be prompted to download the plug-in you need for that page. Some plug-ins are installed automatically while others require you to download the plug-in file. You may need to restart your computer after downloading the plug-in. Visit Thinkfinity's plug-in page in the **Teachers Toolbox** section of the **Teacher Resources** page to see the free plug-ins required for full access to Thinkfinity resources.

KEEP YOUR COMPUTER UP TO DATE: As you explore the Internet, you may encounter slowdowns. While some delays are unavoidable, others can be prevented by making sure your computer is up to date. For example, periodically you need to update the version of your Internet browser and of your operating system (Microsoft Windows or Mac OS). On a Macintosh computer, you can determine the version of your browser by clicking on **Safari** in the upper-left corner and selecting **About Safari**, or if using **Firefox**, by clicking on Firefox in the upper-left corner and selecting **About Mozilla Firefox**. On a PC while in the browser, click **Help** and then select **About Internet Explorer**, **About Communicator**, or **About Mozilla Firefox**.

Safari — http://www.apple.com/support/downloads/

Firefox — http://www.mozillafirefox.us/

Internet Explorer — http://microsoft.com/ie

Netscape Communicator — http://www.netscape.com

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The Thinkfinity program helps teachers prepare students for success in Literacy, Education and Technology in the 21st Century. It is the flagship program of the Verizon Foundation, exemplifying Verizon's vision of advancing and applying technology that touches life.

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